BASIC PATHOLOGY

AND

SPECIFIC TREATMENT

OF

DIPHTHERIA, TYPHOID, AND ALLIED DISEASES.

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THE

BASIC PATHOLOGY

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SPECIFIC TREATMENT

OF

DIPHTHERIA, TYPHOID, ZYMOTIC, SEPTIC, SCORBUTIC, AND PUTRESCENT DISEASES GENERALLY.

BY

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PREFACE.

In the following pages I have endeavored to present a general summary of the basic pathology and specific treatment of some of the most formidable and destructive diseases that afflict and destroy mankind and the lower animals, for they are directly linked in one continuous pathological as well as physiological chain of life. I have therein tried to show that all the varied and complex diseases classed as scorbutic, necræmic, typhoid, zymotic, septic, infectious, malarial, gangrenous, putrescent, and allied affections, by whatever name designated, from the simplest to the most malignant, are dependent upon, or complicated with, one common basic, alkaline, pathogenic factor, mostly the volatile organic alkali—Ammonia, incidental to all forms of life, and differing only in quantity and the constitutional and local manifestations and complications arising from diverse aetiological and pathological conditions, yet underlying and intensifying them all, and thus often complicating and rendering more severe every form of disease, even of the simplest kind, for the successful treatment of which, this primal morbific factor must be decomposed, neutralized, or removed, which can usually be readily effected by acidulous, antalkaline, resolving, and counteracting agents, thus simplifying the hygienic and therapeutic problems in general, and giving more definiteness and certainty to sanitation and therapeutics, or both preventive and curative medicine.

Thus, the recognition and subversion, or neutralization and elimination of this one common alkaline factor of disease, pestilence, and death, inherent in the vital economy, as well as derived from extraneous sources, cannot fail to improve the health and greatly facilitate the prevention and resolution or cure of disease of all kinds, especially those typhoid, septic, zymotic, contagious and malignant maladies directly occasioned thereby, that so largely endanger and destroy the lives of human beings and the inferior creatures. With the special agents for this purpose, I have also briefly considered its collateral relations and morbific complications, with the particular remedies and measures indicated for the prevention and treatment of these diseases, both simple and complex.

I have thus embodied in general, the results of my own observations, experience, and studies thereon, with confirmatory evidence from other sources, believing them to be correct and in direct accord with science and truth. But as individual observation, experience, and effort are necessarily limited, I present them for the serious consideration of the medical profession, and the severest practical test to which they can be put in every way in hospitals and sanitaria for the sick, as well as in private practice, and in quarantine, and elsewhere throughout the world, for preventive and curative purposes; believing that both directly and indirectly their practical application will result in great good in the prevention and cure of some of the most malignant and devastating diseases, with the minor "ills to which flesh is heir," that so sorely scourge and destroy human beings with the inferior forms of life.

As it would, of course, require a large volume to treat of these subjects *in extenso*, I have merely presented a general outline of the main points and basic principles of the most practical importance in a hygienic and therapeutic point of view, to more directly concentrate attention thereon and better enable sanitarians and physicians to avert, counteract, and resolve these morbific plagues with their concomitant evils.

PHILADELPHIA, November 15, 1883.

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Diphtheria, Typhold, Zymotic, Septic, Scorbutic, Putrescent, and Mephitic Diseases Generally.

I.

INTRODUCTION.

The treatment of diphtheria, typhoid, zymotic, scorbutic, septic, putrescent and correlative diseases, like all other morbid states, must necessarily be based upon their basic and true pathology, and although a knowledge of this is most desirable for the greatest certainty in the application of remedial measures, yet, independent thereof, much practical information of therapeusis may be acquired by enlightened observation, experiment, and practice, as well as the more purely empirical and tentative treatment, or the casual juvantia and lædentia, especially if supplemented with logical induction and deduction, and this too, even when the ætiology and pathology of any disease is most obscure and undetermined, as shown for instance, in the empirical discovery of the very general specific effects of cinchona bark with its principal alkaloid, quinia, in the prevention and cure of

intermittent and other malarial fevers, though the *materies morbi* and pathology thereof are so indefinite and occult.

The same holds true in diphtheria with other zymotic and septic diseases, for though their precise ætiology and pathology may not be fully known, yet a definite amount of information thereon has been practically acquired, while clinical experience teaches certain truths with regard to their successful treatment based upon scientific principles and practice as well as empirical effort and unenlightened observation, so that these latter are not to be entirely disregarded, as they sometimes afford valuable data for accurate induction and correct treatment. But in the meantime, while the exact ætiology, pathology and treatment of these formidable diseases are still so largely *sub judice*, reasoning in a scientific spirit, based upon personal and professional, with general observation and experience, cannot fail to greatly aid in the solution of these truly vital problems.

In scientific medicine theory precedes and directs practice; while in empirical effort practice precedes intelligent thought, and is but tentative and experimental at the best, as it can only prove accidentally useful and of most value when carefully conducted in an inductive spirit, but if at random, without due discretion and judgment, will ensue in hap-hazard and destructive rather than in beneficent results. Hence, the most extensive experience without due thought and reflection is but reckless empiricism and usually more injurious than beneficial, for truly "if experience is not directed by theory it is blind," says Bacon, and necessarily more or less confusing if not misleading, as is often exemplified in the empirical treatment

of disease and all other matters. Indeed, purely empirical experience is like a lamp without a light, it is an inert or dead fact that has the basis but not the principle of light within it, yet which when lighted illuminates everything around it and enables those that can see to direct their work and movements with the greatest precision and certainty, instead of otherwise floundering about in the dark tentatively and often injuriously or even destructively to themselves, things and persons about them. Thus theory is a light and compass that enlightens and directs practice, and establishes a scientific and positive, for an empirical and doubtful art of hygiene and therapeutics in the prevention and treatment of disease. In fact then, for scientific accuracy and positive certainty, theory, thought or deduction must precede practice in medicine as in every other branch of knowledge having the slightest claims to the title of science and scientific art; pure empiricism being but a series of blind or random experiments that maims and kills oftener than cures, and long before even logical induction will guide to correct practice. Indeed, it is only by the union of the two co-ordinate systems of induction and deduction that the highest results can be secured so as to develop a true science and art of medicine—culminating in hygiene and therapeutics, the ultimate expression thereof. Legitimate deduction will as surely lead aright to correct conclusions, practice, and discoveries in medicine as it directed Leverrier to the knowledge and discovery of a new planet, and it matters not whether the medical any more than the astronomical discoverer is the practical demonstrator of his own cognitions, the truth and honor are the same in either instance. Hence, from

facts to principles, and from theory to practice, should be the rule in medicine as in all other branches of science, to insure a scientific art of sanitation and rational *methodus medendi*, or true system of preventive and curative medicine.

But as in general, both inductively and deductively, individual thought, investigation and experience must necessarily be limited, it is usually far better to regard the combined observations, experience, experiments, and cognitions of the many as most apt to lead to correct conclusions and practice. Therefore, taking as a basis the observations, experience and knowledge in general, with my own limited investigations and cognitions thereon, I venture to present the following views respecting the ætiology, pathology, prevention and treatment of diphtheria, typhus, cholera, zymotic, septic, infectious, scorbutic, putrescent, mephitic, colliquative and cognate diseases generally, believing them to be founded upon truth and the immutable laws of nature, hence must necessarily be correct and successful in the degree that they are properly applied. With a view then to a clearer exposition of the specific means for the prevention and treatment thereof, I will first briefly present a general outline of the basic source and proximate—if not often the immediate—cause of these destructive maladies as manifested in their etiology and pathology, from the standpoint of my own observations, experience and studies, with confirmatory evidence from other sources.

II.

ÆTIOLOGY AND PATHOLOGY.

While in general, abnormal departures from the normal standard of health are spontaneous from various non-specific intrinsic and extraneous causes, in some there are more immediate special exciting influences or specific contagia, yet in all these varied though correlative maladies there seems to be one common basic morbific factor, promotive of the inception and malignancy of the diverse scorbutic, zymotic, septic, putrescent, contagious, colliquative, adynamic and cognate diseases generally, both constitutional and local. This may be engendered within or be introduced from without the vital economy, or be abnormally increased therein by both. It is of an alkaline nature, resulting from general organic transformation and decomposition in both plants and animals, and without which the specific contagium or exciting cause in each case, whatever it may be, could not develop and act upon the living organism with such intensity and deadly effect as usual in zymotic, infectious and septic diseases, while in some it may be the sole pathogenic factor developing spontaneously various scorbutic, toxic, putrescent and adynamic diseases of a milder type which are, however, the basis of the more malignant and contagious diseases, the intensity, variety and complications thereof depending upon its quantity. It is thus in fact a veritable *fons et origo mali*, and gives the type of malignancy to all diseases, local as well as general. This is strikingly manifested in scurvy, purpura,

necræmia and typhus, as well as in all other septic and infectious diseases arising from the ordinary conditions of life, notably erysipelas, which may be idiopathic or be excited by the slightest bruise or scratch whenever the susceptibility or superalkaline condition of the blood and system exists. This is likewise the case in ship, and doubtless also in yellow, congestive, malarial, and all other malignant fevers, with diphtheria, the exanthemata and the scorbutic type, necræmic tendency, putrid, typhoid, infectious, and dissolutive crasis of diseases generally, as all the symptoms thereof point to this general basic superalkaline condition of the blood and economy, while investigation has demonstrated it to a certain extent.

This common basic morbific alkaline agent of all such diseases is the well-known organic alkali—*Ammonia*, which is being constantly engendered spontaneously within the living organism from the combination of its constituent elements in the chemical reactions and normal disintegration of the components of the body, and often in excess from heat, undue effort and other active causes of organic decomposition, as well as excessive accumulation therein from its abnormal retention within the vital economy. It may also be more or less freely introduced from without the system by imbibition in impure water, and the direct inhalation of its vapor extraneously engendered, or its evolution from various malarious, decomposing and putrefying substances, as it is highly volatile, especially when influenced by heat and moisture, which are so active in tropical climates and warm weather, and in close, hot and moist places everywhere.

Thus, in general, in all these varied scorbutic, typhoid, zymotic, septic, pyretic, malarial, infectious, putrescent, colliquative, and allied diseases, there is this one common basic, underlying and omnipresent morbific factor of an excess of the volatile organic alkali—Ammonia, either generated or retained unduly within, or introduced from without the body, or all combined according to circumstances, of itself engendering and superinducing a scorbutic, necræmic, colliquative, pyrexial, phlegmonous, typhoid, mephitic, infectious, and malignant type of disease. This ammonæmia or superalkaline condition of the blood and system, thus induces an undue solution and fluidity of the liquids, and softening of the solids of the body, with scorbutic, necræmic, toxic, septic, phlogistic, febrile, contagious, adynamic, and decomposing conditions, and tendency to serous and albuminous states and defluxions, congestions, hæmorrhages, inflammations, eruptions and other local lesions, as well as constitutional disorders of a mixed sthenic and asthenic type, and of a putrescent, infectious, gangrenous, dissolving and disorganizing character, especially manifested in typhus, ship, yellow, congestive, bilious, enteric, puerperal and other low fevers, with small-pox, scarlatina, measles, diphtheria, angina maligna, apthæ and gangrene of mouth, throat, lungs and other parts, anthrax and carbunculoid affections, erysipelas, inflammation and abscess of liver, hæmatemesis, hæmaturia, albuminuria, anasarca, leucorrhœa, diarrhœa, choleraic, suppurative, and other serous, hæmorrhagic, lymphoidal, catarrhal and purulent fluxes, with adynamic, febrile and malignant forms of typhoid, zymotic, septic, contagious, mephitic and colliquative diseases

generally, which are specially manifested according to complicating circumstances.

That this ammoniacal and superalkaline condition of the blood and system is a potent underlying morbific factor, and an active exciting, as well as predisposing cause of all such diseases is manifest from all their correlative phenomena and general nature, though it has also been largely demonstrated by observation and experience, as well as by practical therapeutics, a brief outline of which I will present in confirmation thereof, with a view to their direct application to the prevention and curative treatment of these toxical, disorganizing, contagious, pestiferous, and destructive maladies, with the minor scorbutic and mephitic disorders.

Thus, according to Dr. Waring (*Practical Therapeutics*), "Hufeland observes that the officinal and probably all the salts of ammonia have the property to a greater or less degree of dissolving the blood-corpuscles, although slowly, and the protean textures generally. When blood is combined with an ammoniacal salt, it acquires generally a brighter red, but this soon passes into a brownish red hue; it does not coagulate, but forms at best, a loose semifluid cruor, the corpuscles begin to disappear, and the whole becomes more limpid. Blood thus decomposed, progressively evolves distinct traces of ammonia. It is very probable that we may partially explain, upon chemical grounds (solution and disengagement of ammonia), why large doses of hydrochlorate of ammonia act as poisons, and smaller doses, long continued, induce a scorbutic condition. Yet the same salt, judiciously exhibited, furnishes a valuable stimulant to the secretory and excretory apparatus. That chemical attraction is inadequate to

account for the therapeutic and poisonous quality of the hydrochlorate is obvious, inasmuch as it exercises a general action, and induces inflammation of the stomach even when introduced into the subcutaneous cellular tissue.

"Dr. B. W. Richardson has confirmed the statement that the effect of the addition of ammonia to freshly drawn blood, is to prevent coagulation, and to destroy and alter the blood globules. In this respect the action of ammonia resembles that of the fixed alkalies. When ammonia or its carbonate is administered for some time to animals or man, the effect is to modify the blood-corpuscles; they become easily soluble, crenate at the edge, many-sided, colorless, transparent, collapsed, and loosely agglomerated, but not in rolls; and the blood when drawn, or after death, is absolutely fluid or loosely coagulated. These changes in the blood, he thinks, correspond closely with those observed by Jenner in the blood of patients suffering from typhus fevers. By making animals breathe or swallow ammonia, Dr. Richardson has been able to induce a condition resembling the typhoid in man. A superalkaline condition of the blood from the presence of an excess of ammonia is observed in yellow and typhus fevers, and other diseases of the typhoid type, and in cases where the function of the kidney is suppressed. In such conditions, therefore, he believes that the administration of ammonia and other alkalies is contraindicated. The ammoniacal condition of the blood is recognized by the ammoniacal condition of the breath, tested by a rod dipped in hydrochloric acid."

But, better still, even before ammonia can be thus detected in the breath by the scorbutic condition of

the blood itself, and the general appearance of the tongue and lips, or mucous membrane of the interior of the mouth, which have a diffused reddish-brown, purplish or dark cerulean hue, as if the blood was imcompletely oxidized, and the red corpuscles collapsed with their coloring matter diffused through the serum. This ammoniacal or superalkaline condition of the blood is also often manifest in the countenance and general surface of the body, especially in the hands and feet, sometimes to a very marked degree, though a similar scorbutic state may likewise result from an excess of the fixed alkalies, particularly from potassium and its salts.

Moreover, Dr. Richardson found that "the presence of ammonia effectually arrested the oxidation of various substances, and even prevented the action of ozone. Believing that by an extension of the same law, animal substances exposed to ammonia could be prevented from putrefaction, he kept blood and portions of tissues in contact with simple ammoniacal vapor, and with results which were most remarkable. Blood in an ordinary stoppered bottle, if charged with ammonia so as to give a faint ammoniacal odor, would retain its freshness and many of its properties for years. Animal structures in like manner placed, even so as to be massed together in bottles containing ammonia vapor, would retain their freshness apparently for an unlimited time. . . . . .

"The last point to which Dr. Richardson drew attention was the cause of the antiseptic power of ammonia. Ammonia, being a product of decomposition, had been looked on commonly as a substance provoking decomposition. But ammonia was truly the most powerful antiseptic known; it acted catalyti-

cally, by preventing the action of oxygen with oxidizable bodies. . . . . .

"In conclusion, the results presented tended to throw a light on the influence of the ammonia, as the producing causes of some diseases, and as the curative remedies in other diseases. The same rule that pertained to dead pertained to living organic matter. Hence, long exposure to ammoniacal vapor, by arresting oxidation, produced extreme anæmia and a low depraved condition of the system altogether, with reduced respiration, reduced appetite, reduced muscular power, and reduced energy. On the other hand, in cases where a rapid oxidation of the body was being determined, attended with increase of heat and rapid disintegration of tissue, the administration of ammonia, by arresting these changes, became, in judicious hands, the most powerful and effective of remedies. It checked decomposition by its action on oxygen; it held the blood fluid by its solvent power as an alkali; and, being volatile, it inflicted no immediate injuries on the structures of the body."—*British Medical Journal and Dublin Medical Press.*

Yet, ammonia in excess is a powerful caustic and irritant, as well as solvent, while its volatility disseminates it rapidly throughout the system, dissolving and disintegrating the blood corpuscles, exciting, irritating and inflaming the heart and vessels with all the other organs and structures of the body, disorganizing the fluids and solids of the vital economy, and actively promoting dissolution and death as often manifested in ammoniacal and stinking blood, urine and other fluids, with corresponding abnormities, so that for medicinal purposes it has to be given carefully in moderate doses. Hence, while it may preserve dead

animal structure, it devitalizes living tissue, and disorders and arrests life action. As the presence of ammonia in excess prevents due oxidation of the living as well as dead blood and tissues, it thereby in the proportion of its accumulation or quantity in the body, subverts normal arterialization, hæmatosis, nutrition and chemico-organic or vital metamorphosis generally, while by its solvent, irritant, and volatile properties, it causes abnormal liquefaction, excitement, deterioration and disorder of the components, structure and functions of the living organism, thus predisposing and giving rise to numerous and varied diseases of a mixed inflammatory, septic, infectious and adynamic character, both constitutional and local, according to concurring and complicating circumstances, so frequently manifested in typhus, yellow, puerperal, enteric and other asthenic fevers, diphtheria, angina maligna, erysipelas and correlative phlegmasia, with hæmorrhages, albuminous, serous, choleraic and other defluxious, mephitic, malignant, infectious, and colliquative diseases generally.

Besides the constant spontaneous evolution of ammonia in the body from the direct union of its elements in the normal chemico-organic processes of the living economy, it may be, and often is, abnormally increased by undue retention therein, as well as by various inherent and extraneous agencies, until a state of ammonæmia ensues, which, according to its degree of intensity and concurring circumstances of climate, season, weather, temperature, moisture, pestilential and other agencies, occupation, exposure, alimentation, conditions, habits and modes of life, becomes an active predisposing and exciting cause of, with the minor ills, some of the most malignant and

pestiferous diseases that afflict and destroy mankind with the lower forms of life.

Thus, in addition to its internal chemico-vital sources, ammonia may be introduced from without the body by imbibition or inspiration from decomposing organic matter, or from its artificial evolution as is so common and profuse in that pernicious miasm—tobacco smoke, which is diffused so freely everywhere throughout the world, on land and sea, in ships and houses, in hamlet and palace, city and country, indoors and outdoors, in every country and clime, so that scarcely any one can be free from its forced involuntary inhalation and baneful effects. Moreover, with the volatile ammonia therein, tobacco smoke contains those most potent narcotic poisons—nicotia, nicotianin, colludine and other active sedatives, which also deteriorate the blood and depress the nervous and general system, thereby strongly predisposing to, and causing adynamic, scorbutic, septic, infectious, mephitic and colliquative diseases, to which men, women and children are thus so freely exposed everywhere by having their nostrils, throats, air passages and lungs irritated, and their blood and bodies frequently saturated with the noxious fumes of tobacco, in addition to other active causes of disease and death, the separate and combined influence of which sickens, disables and destroys myriads of human beings.

That tobacco is a potent acro-narcotic and prolific source of ammonia with other morbific, alkaline and baneful agents, and its use or exposure to its noxious fumes largely introduces it and them into the system, thereby irritating the nares, mouth, pharynx, air passages, lungs, and heart, corrupting the blood, vitiating the humors, perverting the secretions, depressing the nervous, muscular, mental, and vital

energies, and poisoning the entire economy, ample evidence is afforded everywhere, and much scientific testimony could be adduced in proof thereof, but we will merely present the following of more immediate practical relation to the subject of discussion:

Thus, Dr. Headland states (*Action of Medicine*), "The vapor of burning tobacco contains carbonate of ammonia in considerable quantity. This must necessarily be absorbed to a large extent by the mucous surfaces of the mouth and lungs of smokers" (and likewise of those obliged to inhale it). "Regarded in this point of view, the practice of smoking when continued, may be looked upon in the same light as a course of alkaline medication. It may be attended with the same risk or advantage. It must be ill-suited to those in whom there is a tendency to alkalinity of the humors, and better adapted to the case of those gouty or dyspeptic subjects with whom the contrary obtains. But of course the therapeutic action of the nicotia and other volatile principles of tobacco must be separately taken into account." (p. 143.)

"The smoke of tobacco contains its alkaloid nicotia. This is a powerful poison. If it were allowed to accumulate in the blood the act of smoking would probably be fatal. It is certainly absorbed to some extent, but it passes quickly into the urine where it may be detected by simple chemical tests. Even the small quantity at one time in the system will produce a very marked intoxication in some persons. It is only not a poison because slowly taken into the system in small amounts and eliminated *pari passu*. Dr. Paris has plausibly conjectured that nicotia may be the 'juice of cursed Hebanon' mentioned in 'Hamlet.'

"The careful experiments of Dr. Snow appear to have established the fact that the volatile inebriants are powerful in inverse proportion to their solubility: also that whether inhaled or absorbed from the stomach their action obeys very closely the following law; complete narcotism is established as soon as the blood has dissolved one fifty-sixth part of the quantity it is capable of holding in solution." (p. 269.)

Dr. B. W. Richardson presents in the *Medical Times and Gazette*, the following summary of the noxious effects of tobacco: "1. The effects that result from smoking are due to different agents imbibed by the smoker, viz., carbonic acid, ammonia, nicotine, a volatile empyreumatic substance, and a bitter extract. The more common effects are traceable to the carbonic acid and ammonia; the rarer and more severe to the nicotine, the empyreumatic substance, and the extract. 2. The effects produced are very transitory,* the poisons finding a ready exit from the body. 3. All the evils of smoking are functional in character, and no confirmed smoker can ever be said, so long as he indulges in the habit, to be well; it does not follow, however, that he is becoming the subject of organic and fatal disease because he smokes.† 4. Smoking produces disturbances: (*a*) in the blood, causing undue fluidity and change in the red corpuscles; (*b*) on the stomach, giving rise to debility, nausea, and, in extreme cases, sickness; (*c*) on the heart, producing

* Sometimes, however, they are severe and and persistent; from a slight exposure to the fumes of tobacco I have known them to continue for days and produce very serious illness and prolonged invalidism.

† Although it is a frequent result thereof, as seen in cancer of lip, ulceration of throat, disease of heart, brain, kidney, etc.

debility of that organ and irregular action;* (*d*) on the organs of sense, causing in the extreme degree dilatation of the pupils of the eye, confusion of vision, bright lines, luminous or cobweb specks, and long retention of images on the retina, with other and analogous symtoms affecting the ear, viz., inability clearly to define sounds, and the annoyance of a sharp, ringing, sound like a whistle or a bell; (*e*) on the brain, suspending the waste of that organ, and oppressing it if it be duly nourished, but soothing it if it be exhausted; (*f*) on the nervous filaments and sympathetic or organic nerves, leading to deficient power in them, and to over-secretion in those surfaces—glands—over which the nerves exert a controlling force; (*g*) on the mucous membrane of the mouth, causing enlargement and soreness of the tonsils (smoker's sore-throat), redness, dryness, and occasional peeling off of the membrane, and either unnatural firmness or contraction and sponginess of the gums; (*h*) on the bronchial surface of the lungs when that is already irritable, sustaining the irritation, and increasing the cough. 5. The statements to the effect that tobacco smoke causes specific diseases, such as insanity, epilepsy, St. Vitus' dance, apoplexy, organic diseases of the heart, cancer and consumption, and chronic bronchitis have been made without any sufficient evidence or reference to facts; all such statements are devoid of truth, and can never accomplish the object which those who offer them have in view.† 6. As the human body

* With sometimes neuralgia and spasm of the heart, angina pectoris, paralysis, and sudden death.

† Nevertheless, ample evidence of the truth of such could be adduced if space permitted, some of which we will present, with others the writer can testify to its production of neuralgia, insanity, organic as well as functional disease of the heart, bronchitis, consumption, hæmoptysis and correlative affections.

is maintained alive and in full vigor by its capacity, within certain well defined limits, to absorb and apply oxygen, as the process of oxidation is most active and most required in those periods of life when the structures of the body are attaining their full development, and as tobacco smoke possesses the power of arresting such oxidation, the habit of smoking is most deleterious to the young, causing in them impairment of growth, premature manhood and physical degradation."

The evils of tobacco are not, however, thus so exclusively limited to the young, but extends to all of every age and both sexes, subject to its noxious influence by its use in every form and manner or exposure to its poisonous fumes.

In a paper upon the subject (*Georgia Medical and Surgical Encyclopedia*), Dr. Hollified thus notices some of the evil effects of tobacco upon the human system. "Tobacco effects the system by producing weakness, languidness, vomiting, vertigo, stupor, giddiness, paralysis, nervousness, and great debility, with often fatal prostration. It also acts upon the nervous and circulatory systems to an extent that is both terrifying and alarming, often causing death. When chewed or rubbed it exerts a great influence upon the mucous membrane of the mouth, and also upon the salivary glands, the sublingual and submaxillary, causing them to secrete a larger amount of saliva than nature intended them to do, or than is necessary for the purpose of accomplishing the duties assigned them, thus robbing the system of a portion of its fluids which are required for the healthy maintenance of its animal functions, merely for the gratification of a morbid appetite. The sense of taste is generally

perverted or greatly impaired in all those who either rub or chew the noxious weed.

"When tobacco is smoked it acts as an irritant, and frequently a portion of the smoke is carried into the lungs rendering the air breathed hot and impure. It then acts as a sedative upon the circulation, and often irritates the lining membrane of the air-cells in the lungs, which brings on inflammation, laying broad and deep the seeds of disease which may in time hurry its victim to an early grave. Death has resulted from the inhalation of the smoke," and blindness has been occasioned by it in the case of a gentlemen addicted to smoking, whose sight repeatedly improved when he relinquished the habit. But this "was too strong; at last he gave way to it entirely, and in 1855 was almost totally blind, being only able to distinguish night from day, becoming according to his own acknowledgment, at the early age of twenty-eight years, a victim to the immoderate use of tobacco."

If pertinent to our present purpose, much more evidence upon this latter point might be presented, but we can merely refer to the following, thus: "Dr. Mackenzie, in his great work on Ophthalmology, expresses his belief that tobacco is a *frequent* cause of amaurosis and adds, 'one of the best proofs of tobacco being a cause of amaurosis is in the great improvement in vision—sometimes complete restoration—which ensues giving up the use of this poison,' and cites a very striking case in illustration. With him I agree, also, in the conviction that tobacco is a common cause of the cases of partial loss of sight that are daily to be found at our hospitals." (J. C. Wadsworth, *Lancet.*)

In a report on the progress of Ophthalmology for 1867, Dr. G. Hay, of Boston, refers (*Medical Archives*)

to researches by Hutchinson respecting a form of amaurosis supposed to be due to tobacco, published in the Medico-Chiurgical transactions. "The subjective symptoms given are dimness of vision merely; everything to him seems a fog, but he has no pain in his eyes, nor any photophobia or photopsia. In many cases the patient becomes at length absolutely blind; but in others the disease, having advanced to a certain point, is arrested.

"The intrinsic pathological condition is atrophy of the optic nerve. Mr. Hutchinson observes: 'During the last three years I have held it to be a bounded duty to warn all who present the symptoms of this disease against smoking, and in only a few instances (provided the patient was seen early), did the disease afterwards progress to blindness.' Mr. Wordsworth and Mr. Critchett are equally positive in their opinion in regard to the deleterious effects of tobacco, and state that much smoking is the ordinary cause of the atrophy. Granting that a similar condition is occasioned by other causes, the former, before the Hunterian Society, delared that he believed he could with the opthalmoscope pick out *smokers* from *non-smokers* in cases of optic nerve atrophy. *Abstinence is the cure.* Mr. Critchett commits himself unhesitatingly to the opinion that although in many cases all medical treatment will be unavailing, yet the abandonment of tobacco will arrest the further progress of the disease."

The *Medical Press and Circular* states that "in a prize essay on tobacco, Hampton Brewer, L. R. C. P., London, quotes Dr. Hardwicke, Mr. Curgenven, Dr. Menzies, Dr. Broadbent, Mr. Hutchinson and Dr. C. R. Drysdale, as being convinced that tobacco smoking produces palpitation of the heart, impotence, in some

cases; irregularity of bowels, congestion of the fauces, susceptibility to cold, dyspepsia, amaurosis, and palsy in some cases. We heartily agree with the author in his opinion as to the very injurious effects of tobacco, in whatever form it may be used."

In relation to the noxious effects of tobacco smoke upon children, Dr. E. Decaine contributes to *The Revue de Therapeutique Medico-Chiurgicale*, February 15, 1869, *Dublin Quarterly Journal and Half-Yearly Abstract.* "Having described his experience in relation to this matter, he concludes: 1. That the pernicious effects of tobacco smoke upon children are incontestable. 2. It produces pallor, chloro-anæmia, palpitations of the heart, diminution of the normal number of blood globules, and difficult digestion. 3. The ordinary treatment for chloro-anæmia and anæmia produces no effect so long as the habit of smoking is persisted in. 4. Children who are addicted to smoking exhibit a want of intelligence, and have a liking more or less decided for strong drinks. Children who abandon the practice of smoking before any serious organic lesions are produced, speedily recover from disorders of the system, of which even traces do not generally remain."

But comparatively few children, though many adolescents, use tobacco, yet great numbers of all ages, from the newly-born infant to the oldest adult, are more or less freely exposed to its pernicious fumes and noxious miasma, sufficiently to either actively sicken or induce a state of semi-invalidism, and reduce their vital power below the norme, so as to render them more liable to intercurrent and epidemic diseases, which they would otherwise escape.

Upon the deleterious effects of tobacco, Sir Benjamin Brodie, thus writes in a letter to the *London Times*,

republished in the *Medical Times and Gazette*: "The effects of this habit are indeed various, the difference depending on difference of constitution and difference in the mode of life otherwise. But, from the best observations which I have been able to make on the subject, I am led to believe that there are very few who do not suffer harm from it to a greater or less extent. The earliest symptoms are manifested in the derangement of the nervous system. A large proportion of habitual smokers are rendered lazy and listless, indisposed to bodily and incapable of much mental exertion. Others suffer from depression of the spirits, amounting to hypochondriasis, which smoking relieves for a time, though it aggravates the evil afterwards. Occasionally there is a general nervous excitability, which, though very much less in degree, partakes of the nature of the *delirium tremens* of drunkards.* I have known many individuals to suffer from severe nervous pains, sometimes in one, sometimes in another part of the body. Almost the worst case of neuralgia that ever came under my observation, was that of a gentleman who consulted the late Dr. Bright and myself. The pains were universal, and never absent; but during the night they were especially intense, so as almost wholly to prevent sleep. Neither the patient himself nor his medical attendant had any doubts that the disease was to be attributed to his former habit of smoking, on the discontinuance of which he slowly and gradually recovered. An eminent surgeon, who has a great experience in ophthalmic diseases, believes that in

* Dr. Chapman and others have recorded cases simulating *delirium tremens* from the use of tobacco. (*Vide U. S. Dispensatory*, and reports of insane asylums). The writer also had an obscure case of insanity which nothing relieved until tobacco smoking was discovered as the cause, and discontinued, when recovery speedily ensued.

some instances he has been able to trace blindness from amaurosis to excess in tobacco smoking; the connection of the two being pretty well established in one case by the fact that on the practice being left off, the sight of the patient was gradually recovered. It would be easy for me to refer to other symptoms indicating deficient power of the nervous system to which smokers are liable; but it is unnecessary for me to do so; and, indeed, there are some which I would rather leave them to imagine for themselves than undertake the description of them myself in writing.

"But the ill effects of tobacco are not confined to the nervous system. In many instances there is a loss of the healthy appetite for food, the imperfect state of the digestion being soon rendered manifest by the loss of flesh and sallow countenance. It is difficult to say what other diseases may not follow the imperfect assimilation of food continued during a long period of time. So many causes are in operation in the human body which may tend to a greater or less degree to the production of organic changes in it, that it is only in some instances we can venture to pronounce as to the precise manner in which a disease that proves mortal has originated. From cases, however, which have fallen under my own observation, and from a consideration of all the circumstances, I cannot entertain a doubt that, if we could obtain accurate statistics on the subject, we should find that the value of life in inveterate smokers is considerably below the average. Nor is this opinion in any degree contradicted by the fact that there are individuals who, in spite of the inhalation of tobacco smoke, live to be old, and without any material derangement of the health; analogous exceptions to the general rule being met with in the

case of those who indulged too freely in the use of spirituous and fermented liquors."

Moreover, exceptional cases are also met with in those who use opium, arsenic and other poisons, and long-lived persons are met with in malarious regions, but these anomalous instances do not prove that such noxious agents as alcohol, tobacco, opium, arsenic, malaria, etc., are conducive to health and longevity, when the general experience overwhelmingly preponderates in demonstrating their potent deleterious and destructive properties. Besides, even if the lives of a comparatively few persons are prolonged in spite of the baneful effects of such pernicious influences as tobacco, alcohol, etc., it is only the lower vegetal and animal existence that persists, the higher intellectual and psychical life being more or less deadened, so that the nobler faculties of the soul, that every one of any aspiration above the nature of the inferior creatures so earnestly desire, are debased and stifled, while the offending or exposed individual is proportionably reduced in the scale of being nearer to the plane of brutes rather than refined and developed toward the more exalted spiritual attributes of mankind, to say nothing of the higher affinity with the Godhead.

Respecting the evil effects of tobacco on the brain and nervous system more particularly, Dr. Willard Parker, of New York, states (*Med. and Surg. Reporter*), "This poison enfeebles the mind. The Emperor Napoleon had his attention called to this subject in 1862 by a scientific statistician. It was observed from 1812 to 1862 that the tobacco tax averaged twenty-eight millions of francs annually and there were eight thousand paralytics and insane in the hospitals of

France. In 1832 the tobacco revenue had reached one hundred and eighty millions, and in the hospitals were forty-four thousand paralytics, etc. The undoubted inference is that tobacco has a strong influence in producing these classes of nervous diseases.

"A commission was then appointed to inquire into the influence of tobacco in the schools and colleges. After a full and careful investigation this commission reported that it had divided the people into two classes the *users* and *non-users* of tobacco, and then proceeded to compare them physically, intellectually and morally. The result was that those who do not use tobacco were stronger, better scholars and had a higher moral record. In consequence of this report an edict was issued prohibiting the use of tobacco in these national institutions, by which thirty thousand persons were at once forced to abandon it."

But these observations take no cognizance of the many thousands of innocent persons of all ages and both sexes, from the newly-born babe to the most aged, degenerated, enfeebled, diseased and degraded—physically, mentally and morally, or destroyed entirely by the enforced inhalation of this potent poison, inflicted upon them by smoking barbarians, almost everywhere against every principle of sanitation, right and justice.

On the "Influence of Tobacco in Diseases of Nerve Centres," Mr. Tamisier states in the *Bulletin de l'Association Franc, cont l'Abus du Tabac*, quoted in the *Doctor* (*Med. and Surg. Reporter*), "That out of fifty-nine grave affections of the nerve centres observed from 1860 to 1869 among men, forty occurred in smokers. In fifteen cases of hemiplegia, nine abused

tobacco and two used it moderately, four did not smoke. Of eighteen cases of paraplegia, five were great smokers, three moderate smokers, and ten abstained from tobacco. Out of sixteen cases of locomotor ataxia, ten were great smokers, five moderate and one abstained. Tamisier thinks that it is especially, if not wholly, to this cause that we must attribute the disease in the majority of cases of hemiplegia and of ataxia he has noticed since 1869. M. Lefevre, of Louvain, thinks it indubitable that excessive smoking causes paralytic mania; because, (1) nicotine causes in animals progressive enfeeblement of the muscles of motion up to paralysis and congestion of the nerve centres; (2) analogous symptoms have been noticed in numbers of persons who abuse tobacco in smoking or chewing; (3) it has been found in all countries that there is a constant relation between the consumption of tobacco and the increase of general paralysis."

"Effects of Alcohol and Tobacco on the Sight, on the subject of color blindness and amblyopia, Dr. Richard H. Derby (*New York Med. Journal*), says, 'Almost always both eyes are affected. This form of amblyopia occurs almost solely in men; out of fifty-six cases only three were women. It is a disease of adults, its frequency increasing from the twentieth to the fortieth year. In a portion of the cases abuse of alcohol was certainly the cause of the affection and in others the excessive use of tobacco undoubtedly contributed to produce the disease. Forster, in a paper on the injurious action of tobacco on the vision attaches still greater importance to this agent as a cause of amblyopia, supporting the views of Mackenzie, Sichel, Hutchinson, Lureiro, and others. The

author cites twenty cases in which there was a central scotoma with a horizontal diameter of 18° to 25°, within which large letters could still be recognized. All of these patients suffer from some affection of the digestive and nervous system. Loss of appetite, constipation, loss of sleep were common symptoms. Each one of the twenty patients was a strong smoker, and in eleven of these cases a very marked improvement was observed when the use of tobacco was given up."—(*Detroit Review of Medicine and Pharmacy.*)

In some observations in the *Anti-Tobacco Journal* on the effects of this agent upon the animal economy, Dr. John C. Warren makes the following remarks in relation to its deleterious action on the tissues of the mouth: "Tobacco is by some persons recommended as beneficial to the teeth, but while it can have no material effect in preserving the bony substance of the teeth it has a real influence on their vitality by impairing the healthy action of the gums. These and also the adjacent parts are very subject to cancer, particularly the tongue and lips. For more than thirty years I have been in the habit of inquiring of patients who came to me with cancers of these parts, whether they used tobacco, and if so, whether by chewing or smoking. If they have sometimes answered in the negative as to the first question I can truly say that to the best of my knowledge and belief such cases are exceptions to the general rule. When, as is usually the case, one side of the tongue is affected with ulcerated cancer, it arises from the habitual retention of the tobacco in contact with this part. The irritation from a cigar or even from a tobacco pipe frequently precedes cancer of the lip. The lower lip is more commonly affected by cancer

than the upper in consequence of the irritation produced in this part by acrid substances from the mouth. What is more likely to cause a morbid irritation terminating in disease, than the frequent application of tobacco juice? The want of attention to cleanliness often connected with this practice and the consequent lodgment of the particles of tobacco on the surface of the lip has a great influence in these cases.

"Aged persons are very liable to cancer especially about the face, and when any irritating substance is applied habitually, the skin becomes disordered and takes on a cancerous action. This irritation may be produced by the use of tobacco in the interior of the mouth, by the habitual application of a cigar to the lips and even by a pipe applied to the same parts. Few days pass without my having an opportunity of witnessing the verification of these facts."

In relation to cancer in smokers the *Med. and Surg. Reporter* states that "M. Bouisson, of Montpelier, has given another blast against tobacco in deducing the increased prevalence of labial cancer from its excessive and long-continued use. He relates sixty-eight cases affected with cancroid and cancerous tumors in persons addicted to smoking and thence traces a complete pathological history of the disease."

. . . . . .

"There is no doubt says M. Bouisson, that cancer of the lip and other parts of the mouth has become more frequent in proportion to the increased number of smokers and to the increased amount of smoking among those who had already contracted the habit the disease has progressed with the habit. . . . . Besides the increased frequency of labial epithelioma,

the author brings the following reasons to his aid, viz.: it attacks the lower lip most frequently on which the pipe-stem or cigar habitually rests; it is rare among women and children. M. Bouisson speaks of a woman who was affected, but she was an inveterate smoker, and the older the smoker the more common is the disease, most of the cases being in men over forty years of age. Among the poorer classes who smoke short pipes and bad tobacco the disease is developed sooner than among the rich who smoke delicate cigars and long pipes and who neutralize the local effects of the combustion of the tobacco by hygienic means. The local action of the heat on the lips has probably some effect in the production of the disease, but tobacco alone would suffice. M. Bouisson gives the case of a physician of Barcelona, from whom he removed some epithelial vegetations in the nostrils, which he had no hesitation in ascribing to the practice so common among the Spaniards of eliminating the smoke of their cigarettes through the nose, and it is thus probably that in many cases epithelial cancers of the tongue, cheeks, arch of the palate, gums and tonsils are produced." Other surgeons testify to the same effect, Mr. Jonathan Hutchinson states (*Med. Times and Gazette*), that "From the statistical analysis of 127 cases of epithelial cancer in the lip, I was able to show, first, that women are the subject of this disease in the proportion of only five to every one hundred males, second, that when it does occur in women it is usually in those who have been accustomed to smoke."

In a recent discussion upon the subject of the use tobacco in the Suffolk District Med. Society, Mass. (*Jour. Amer. Med. Assoc.*, Feb. 9, 1884), "Dr. H. I.

Bowditch said that it is high time that some measures were adopted to stop, or at least restrain the use of tobacco. For thirty years he has continuously found a certain number of patients who have presented the symptoms of grave functional disturbance of the heart, for which no cause could be found except tobacco. There is no organic cardiac lesion, but it is a nervous weakness. This condition was very commonly observed during the late war. Nearly all the soldiers smoked and many gradually acquired what was appropriately named 'the tobacco heart.'

"In habitues of tobacco we frequently find errors of digestion, sometimes of the most refractory character, though many persons commence to smoke from the supposition that the digestion is benefitted by the use of tobacco. There is no question upon the fact that mental disease may be induced by the poisonous action of nicotine, and many smokers who are not insane have been rendered exceedingly nervous and irritable by the prolonged use of tobacco, and immediately give unmistakable evidence of absolute derangement if the customary indulgence is for any reason withdrawn."

Yet they cannot recover unless they do discontinue the use of the poisonous drug, and the observation of the writer and others proves that it is essential to the restoration of health, which often promptly follows its disuse.

Dr. Prince observed that "In cigarette smoking the vapor is inhaled and coming in contact with the delicate mucous membrane of the air passages, its active properties are at once absorbed and produce an immediate effect, which can be perceived to the tips of the fingers. The succeeding sensation is one

of ennui, malaise, indolence, and muscular hebetude, which soon becomes burdensome unless the stimulant be renewed and prolonged by a fresh cigarette." This, however, necessarily only increases the evil, like drinking spirituons liquors to temporarily whip up the system from its resulting depression.

"Dr. Langmaid stated that the most important questions in cigarette smoking are these: Does the inhalation of the vapor induce any disease of the mucous membrane with which it comes in contact? Does the smoke act upon the mucous membrane simply as smoke or from the fact that it contains nicotine? Does smoking increase naso-pharyngeal catarrh? To these an affirmative reply must be given. If the mucous membrane is irritated, smoking invariably makes it worse. Will smoking produce a catarrhal state when none exists, or awaken a new one in a patient who has been cured of the disease? Observation teaches that it can do this. There is an increased secretion from the membrane and all the other features of a catarrhal condition. Singers almost invariably abstain from smoking on those days upon which they expect to sing."

"Dr. Bowditch added that he will not treat a patient for sore throat unless smoking is abandoned for the time."

Thus, irritation, inflammation, ulceration of and defluxion from the mouth, throat, and air passages are excited by tobacco, with ammonæmia, superalkalinity and scorbutic condition of the system, which induces a malignant tendency to all diseases, local and general, and develops such diseases as diphtheria, cynanche maligna, typhoid fever, choleraic and other gastro-intestinal affections with cognate maladies, in both

those who use and are exposed to this pernicious acro-narcotic poison.

Besides, the local action of tobacco both upon the mucous membrane and skin is more immediately dangerous and may occasion speedy death, especially when applied to abraded or ulcerated surfaces, as exemplified in the following instance, with others on record. "A case of death from nicotine recently occurred at Cohoes, N. Y., under the following circumstances: The father of a little girl in an endeavor to 'heal a sore on her lip,' applied to it the contents of a 'rank' pipe-stem. The victim was almost immediately seized with the peculiar symptoms of tobacco-poisoning and died a few hours afterward."—*Med. Record.*

"Even the external application of the leaves or powder [of tobacco] is not without danger especially when the cuticle is removed. A case of death is on record occurring in a child eight years old, in consequence of the application of the expressed juice of the leaves to the head for the cure of tinea capitis. Death has also been produced by the inhalation of the smoke."—*U. S. Dispensatory.*

Before, however, there is one case of cancer or speedy death thus produced by tobacco, there are numerous instances of local irritation, inflammation and ulceration of the mouth, fauces, nares, and contiguous parts, with general poisoning of the blood and system by saturating the body with ammonia, nicotia and its other noxious ingredients, thereby preventing oxidation of the fluids and solids of the economy, causing anæmatosis, dyspepsia, mal-nutrition, diseases of the throat, air passages, lungs, heart, stomach, liver, kidneys, brain, nervous, muscular and

general system, in fact, deterioration, depression and disease of both body and mind; often ending in inanition, consumption, insanity, paralysis and death, not the less sure because it is so generally insidious and slow, though frequently directly well-marked and prompt in its poisonous action, corroborative evidence of which might be adduced sufficient to fill a volume in proof of the local and general poisonous influence of tobacco upon the vital organism, but it is believed the preceding will amply suffice for the special designs of this work, though the following instructive case may serve to further demonstrate the potent toxic power of this noxious drug.

A striking example of the certainty and rapidity with which a superalkaline, scorbutic, and poisoned condition of the blood, with oppression of breathing, depression of the heart, nervous and general system, may be produced by even a slight exposure to the noxious fumes of tobacco is presented in the case of a gentleman under my care, who is a martyr to its baneful effects and has suffered untold misery therefrom. Thus, a very moderate inhalation of the fumes of tobacco emanating from the body and clothes of a smoker, and so much the more from the smoke itself, always causes a swooning sensation (even before he smells it or is otherwise aware of its presence), with headache, neuralgia of the maxillary and facial nerves, neuralgia, spasm, and soreness of his heart, feeble, intermitting pulse, shortness of breath, huskiness of voice, sickness of stomach, torpor of liver, cholæmia, and such a deterioration of his blood as to induce swelling and soreness of his gums, with sometimes bleeding therefrom, looseness of his teeth, alveolar abscess, suppression and disorder of the functions of

the chylopoietic viscera, and general prostration, with even an occasional attack of cholera morbus. Some years since a slight exposure to the fumes of tobacco (wilfully inflicted upon him, as he verily believes, by one who knew his infirmity), laid him up in bed for ten days with congestion of, and hæmorrhage from his lungs, and invalided him for a long time thereafter. In fact, he is so susceptible to the poisonous effects of tobacco, directly upon his blood, heart, and nervous system, as to seriously endanger his life and induce a state of enforced invalidism from occasional accidental exposures thereto, so that he is obliged to carefully avoid it, and every one that uses it, hence to live a very retired life to be free therefrom; during which his health is generally good though not vigorous, except a persistent tendency to alveolar abscess, and laryngeal irritation with tubercular sputum therefrom that sinks at once in water, and weakness of voice, which get better or worse with the varying states of the system, according to freedom from, or exposure to the pernicious action of the tobacco miasm, as in his efforts to maintain himself he is compelled to go about more or less, although at much risk, having thus to struggle against a state of enforced invalidism, seclusion, and privation, inflicted upon him by this smoking barbarism of the age from those thus engaged in artificially generating and diffusing this potent pestiferous tobacco miasma, which he is powerless to resist even in a moderate degree, and unable to altogether avoid by an isolated life, so that after enduring untold torture of body and mind therefrom, he will doubtless fall a sacrifice to this baneful poison and barbarous custom of tobocco smoking.

This, of course, is an extreme case, but with other evidence, it strongly illustrates the pernicious power of tobacco to induce a superalkaline, scorbutic, and toxic condition of the blood, arrest oxygenation and circulation, subvert nutrition and secretion, and produce depression of the nervous, muscular, and general system, directly dangerous to life, as well as promotive of congestive, hæmorrhagic, toxæmic, necræmic, scorbutic, zymotic, septic, mephitic, lithæmic, and adynamic diseases, with local disorders of the nares, mouth, throat, air-passages, lungs, heart, stomach, liver, bowels, brain, kidneys, and other organs, according to special tendencies and circumstances, or a toxic state of *nicotism*, analagous to narcotism and alcoholism. This potent tobacco poison thus strikes at the very basis of life—the blood, heart and circulation, with the nervous and nutritive systems, and kills many who are thought to die with other forms of toxæmia, paralysis of the heart, brain, and nervous system, or affection of the lungs, kidneys, with other diseases, when the real cause is *nicotism* of the blood, heart, lungs, kidneys, brain, nervous, and general system, especially in weakly and sensitive men, women, and children, who are largely afflicted and sacrificed thereby. Nor is this singular in view of the peculiar constitution of tobacco, it being a congeries of some of the most powerful alkalies and poisons known, the principal of which are ammonia, with nicotia, nicotianin, colludine, the pycoline bases, and other noxious agents, nicotia alone being a potent alkali, emetic, cathartic, narcotic and sedative, ranking next to prussic acid, which itself is said to be a constituent of tobacco smoke by eminent authorities. (*Vide National, U. S., and other Dispensatories.*)

Thus, this ammonæmia and superalkalinity of the blood and body from whatever cause, whether from intrinsic systemic or extraneous sources, or both combined, has a direct *basic* influence in the production of a great variety of constitutional and local diseases, of a more or less grave and pestilential nature according to special morbific circumstances of alimentation, climate, meteorological, malarial, and other pathogenic conditions, occupations, habits and modes of living, such as scurvy, purpura, congestive, typhus, typhoid, yellow, bilious, remittent, puerperal, and other low fevers, with small-pox, cerebro-spinal meningitis, scarlatina, measles, cynanche maligna, diphtheria, erysipelas, eczematous, with carbunculoid affections, cholera, and correlative zymotic, septic, mephitic, infectious, scorbutic, adynamic, and colliquative maladies, some of which may be excited, and all intensified, by exposure to the pestiferous miasm of tobacco smoke, with other ammoniacal, or alkaline, sedative, and noxious agents.

Besides its general influence to produce an ammonical or superalkaline, poisoned, and scorbutic condition of the blood, with disorder of the circulation, and depression of the nervous and general vital energies, tobacco also exerts a special ætiological power to excite disease of the nares, mouth, throat, air-passages, lungs, heart, stomach, liver, bowels, kidneys, brain, and other organs, even in adults, and so much the more in children who are so susceptible thereto and freely exposed to its noxious influence everywhere. Hence, as this tobacco miasm produces similar pathological conditions both local and constitutional, it is more than probable that it is a prolific exciting as well as predisposing cause of that generally prevalent and fearfully destructive disease—diphtheria, and actively

increases its inception, intensity, and fatality, with that of all other correlative zymotic, septic, and adynamic maladies previously indicated. Smokers are thus actively engaged in poisoning, degenerating, diseasing, and destroying themselves, children, and others (of all ages and both sexes), by engendering and diffusing everywhere, this pestiferous tobacco miasm, that all exposed thereto must inhale and poison their blood and bodies therewith *nolens volens*, the pernicious effects of which are usually attributed to some occult infection, microzyme, or other obscure cause, when they are really entirely due to this baneful tobacco malaria, independent of, though often complicated with, other morbific and specific pestilential agents.

In the pathology of diphtheria there are three prominent lesions, viz.: (*a*) of the blood and circulation, of a superalkaline, scorbutic, and toxical nature; (*b*) of the throat, with congestion and inflammation, ulceration and plastic exudation, though this latter may also occur in other parts of the body; and, (*c*) of the nervous centres more directly connected with the pharynx, as well as of the system in general of an adynamic type; all of which are thus of an asthenic character. But while in the lesion of the throat, the most marked characteristic of the disease is of an inflammatory nature, it is of a low grade and more analogous to erysipelatous and gangrenous, than ordinary croupous inflammation, though closely allied therewith, the membranous exudate being alike fibrous in both. Yet, in general, croup and diphtheria differ widely in both their pathology and treatment, the former being of a more purely local sthenic inflammation, with fibro-plastic exudation independent of a

primary scorbutic and toxæmic complication and systemic debility, while the latter is of an asthenic inflammatory character dependent upon, or complicated with, ammonæmia, septicæmia, and general adynamia.

These diseases, however, correlate and merge in every degree with each other, like all other inflammatory and septic disorders, though the extremes are well marked, and which give rise to such endless confusion both in pathology and therapeutics.

In diphtheria the basic lesion is in the blood, that vital fluid becoming deteriorated, scorbutic, toxæmic, septic, and infectious, from apparently an excess of the organic alkali—Ammonia, engendered within, or introduced from without the body, or both together with other deleterious agents. This ammoniacal state of the blood, or ammonæmia, induces a toxical, solvent, and inflammatory condition thereof, with disposition to congestions, defluxions, and plastic exudations, with purulent and gangrenous affections and low forms of disease, from local irritation of any kind, often more particularly in the liver, lungs, air-passages, and pharynx, perhaps from their supersusceptibility to extraneous with intrinsic exciting causes of disease, of which the irritant, depressing, alkaline, and toxic fumes or smoke of tobacco are an active exciting, as well as predisposing, cause thereof, though the same agencies and dyscrasia will operate to produce a variety of asthenic diseases—local and constitutional, according to special tendencies, and complications, specific infections, climatic, malarial, meteorological, and other influences.

Thus, this one pernicious miasm of tobacco alone, supplies all the active ætiological and morbific factors to engender diphtheria, with correlative affections, as

by its ammonia and nicotia, it induces superalkalinity of the blood, and still more general toxæmia from these and its other noxious constituents, besides those corrupt products secondarily developed and retained in the blood and body from its baneful action thereon, while it directly irritates the throat and air-passages, and excites congestion, inflammation, and ulceration therein, powerfully depresses the nervous and vital energies, and paralyzes the heart, brain, nervous, muscular, and general system, even of adults, and so much the more of children, who are so susceptible to this pestiferous poison and disease. Moreover, when to this is superadded other potent morbific factors, as various forms of malaria, cold and moisture, undue exposure to bad weather, confined and impure air, draughts, and other causes of ammonæmia, septicæmia, and catarrh, with defective dietary, and bad modes of living, it is not wonderful that diphtheria is so frequent and fatal, but that it should not be more prevalent and deadly.

The origin of this frequent and fatal disease—diphtheria, with all allied maladies, is, I believe, of a more purely chemical or chemico-organic character, inherent in the system, rather than dependent upon extraneous organic entities, especially of the now fashionable microzymes, the presence of these being secondary and subordinate, rather than primary and supreme factors of this, with other diseases, now so exclusively attributed thereto. The germ theory is defective in that it assumes sequents for antecedents, effects for causes, and disregards too much the inherent chemico-organic and bio-dynamic basis of disease as well as health, disease and death with life and health being inherent in the vital organism, independent of

extraneous agencies, though necessarily correlated therewith, especially those chemical and dynamical influences comprised in food and air, heat, light, electricity, etc., essential for organization and life action. If the germ theory was so generally true where did the primordial germ receive its morbific germ from to excite disease *ab initio?* While there may be parasites *ad infinitum*, there must necessarily have been none such with the primeval organism which started anew from its constituent chemical elements, the abnormal variations or aberrations of which with their affinitive forces created abnormal conditions, or disease. It is, therefore, apparent that these accredited pathogenic micro-organisms cannot always or even so frequently as usually thought, be the primary ætiological factors of disease, but rather secondary and sequential products or concomitants and complications thereof, the ammoniacal, scorbutic, septic, and necræmic conditions of the blood and components, or humors and tissues of the diseased economy affording an appropriate nidus for their development, existence, and activity, organic decomposition everywhere being a prolific source and support of microzymes and the lower organisms.

Diphtheria, in my opinion, is frequently of spontaneous origin from morbid systemic and local chemico-organic and dynamic action, as well as often developed and intensified by extraneous chemico-toxic and alkaline agents like tobacco, ammonia, sewer gas, foul air, meteorological, and other inorganic agencies, independent of micro-organisms or infection, though like erysipelas, capable of transmission after its spontaneous as well as secondary inception, when there are favorable conditions for its communication,

as a specific contagium is engendered in both instances. The same rule applies, I believe, with all the zymotic, septic, contagious and infectious diseases, which may originate spontaneously and engender a specific virus in each instance, that will extend their special maladies indefinitely unless counteracted by some suppressing power, the intensity thereof being proportionate to the basic superalkalinity of system. This spontaneous development of specific disease and contagium is clearly manifested in grease, glanders, hydrophobia, gonorrhœa, erysipelas, puerperal, and typhus fevers, with, in my opinion, all other correlative maladies from the least to the most contagious, which though usually transmitted, often also originate *de novo*, like fire in spontaneous or artificially developed combustion, and secondarily communicated whenever the essential factors of either are brought together by accident or design. In fact, in accord with the general laws of nature, it is most probable that all diseases—from the most benign to the most malignant and contagious, originate spontaneously, as all the former, and some of the latter, are known to do, whenever concurring circumstances are favorable, which it is the object of science to discover and counteract in all cases alike.

That there is thus some insidious potent and general cause of diphtheria with allied septic, contagious, and adynamic affections, independent of the usual extraneous morbific agencies, is manifest from their frequent spontaneous development where there is comparative freedom from the ordinary most active pathogenic influences both contagious and innocuous, even where the sanitation seems to be so perfect as to avert or counteract the tendency to the milder

abnormities much less to permit the origin of any malignant disease. In relation to this subject, with regard to a recent epidemic of diphtheria in Mansfield, Ohio, Dr. Mary J. Finley thus concludes (*Cincinnati Lancet and Clinic*), "A careful study of a number of reports of diphtheria in different parts of the United States and in other countries, has convinced me that epidemic diphtheria occurs with almost equal malignancy under the best and the worst sanitary conditions. The most desirable hygienic surroundings, and the most irreproachable water supply, afford no security against its attack."

Yet, while there may be almost perfect sanitary precautions and conditions in other respects, there is one potent miasm and morbific factor of diphtheria with allied diseases artificially engendered and diffused almost everywhere throughout the world from the hovel to the palace among all classes and conditions of people, from the lowest to the highest, in the omnipresent and pestiferous tobacco smoke that penetrates and pollutes the lungs, blood, and bodies of all exposed to its pernicious influence, alkalizing and poisoning the fluids and solids of the body, depressing the nervous and vital energies, irritating the throat, air-passages and lungs, and specially predisposing to, and exciting adynamic and malignant diseases, both local and constitutional, and directly and indirectly of the pharynx as well as other parts of the system. Hence, in view of the almost universal presence and powerful morbific influence of this potent alkaline and acro-narcotic tobacco miasm, it is not at all surprising that diphtheria and its pestiferous analogues arise and spread spontaneously so frequently, generally, and fatally. It does not follow that because

this powerful acro-narcotic is unsuspected or disregarded that it is less actively poisonous and destructive, any more than the unrecognized presence of carbonic acid would diminish its baneful and deadly effects.

Dr. Willard Parker, of New York, says (*Medical and Surgical Reporter*), "That tobacco is a poison, is proved beyond question. It is now many years since my attention was called to the *insidious* but positively destructive effects of tobacco on the human system. I have seen a great deal of its influence upon those who used it, and worked on it, or in it. Cigar makers, snuff manufacturers, etc., have come under my care in hospitals and private practice; and such persons *never* recover soon and in a healthy manner, from any case of *injury* or fever. They are more apt to die in epidemics, and more prone to apoplexy and paralysis, the same is true, also, of all who *chew* or *smoke* much." And, it might have been truthfully added, likewise of those who are exposed to the baneful influence of this pernicious poison in any manner or form.

"M. Mercier in corroboration of the unsuspected effects of tobacco in generating disease, related a case in which a cough, which had persisted for a year, and purpura, which had lasted for seven months, soon yielded after the cessation of smoking, which had been excessive. His own practice had furnished him full proof of the depressing effect of this agent upon the generative functions."*—*L' Union Med.* and *British and For. Med. Chir. Rev.*

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* In moderate quantities, however, tobacco excites the sexual passions, and stimulates to vice and immorality.

But cases are frequently presented of affections of the mouth, throat, nares, air-passages, pulmonary, and other organs, blood, nervous and general system, usually attributed to various other causes, that are really directly produced by this potent tobacco poison, as demonstrated by the marked improvement and rapid recovery when relieved therefrom.

The following observations of repeated outbreaks of diphtheria in isolated places far away from contagious influences and previous existence of the disease, strongly support this view of its frequent development *de novo*, when concurrent conditions are favorable to its occurrence.

Dr. T. J. Hutton, of Minnesota, states in the *Medical Record*, quoted by the *Scientific American* that within the past three years he has treated sixty-four cases of diphtheria. "These cases were all in comparatively new houses, in a belt of country where white men never lived before, so that the soil contained no sewage, and had no accumulation of surface filth. Diphtheria had never before been there, and could not have been brought by visitors; it was of a malignant type, and some families lost five and six members each. All of these cases were included in seventeen rural outbreaks, three of which were in summer, and seventeen in winter, and every house attacked was small and greatly overcrowded. Many of the winter outbreaks happened when the temperature was 30° to 40° F. below zero, which would have been death to all ordinary surface germs, and in one instance the thermometer registered 60° below, when the surface of the earth and all bodies of water were frozen solid." In the absence of most of the usually attributed causes thereof, Dr. Hutton infers that

"diphtheria is caused by ochlesis or crowd poison," and "may occur sporadically, any small overcrowded, ill ventilated house may prove a diphtheria factory." That temperature directly has none, but indirectly much to do with it, as overcrowding with confined air is most apt to occur in cold weather, hence "an abundance of pure air is the first requisite in treatment. I have seen patients apparently moribund, restored by fresh air and food alone. So have other observers."

But this so-called "crowd poison" is largely composed of the ammoniacal and organic excreta from the lungs, blood, and bodies of many human beings confined in a limited space. While in the cases cited they were doubtless augmented and intensified by the additional baneful miasm of tobacco smoke, with its noxious component ammonia, nicotia, and other poisons, which are generally so freely and recklessly engendered and diffused everywhere to the injury of sensitive and sickly men, women, and children especially, thus acting both as predisposing and exciting causes of diphtheria and allied throat, with other asthenic diseases—local and constitutional—in persons of all ages, young and old, weak or strong, who are incapable of resisting the potent morbific influence of any one of these baleful poisons, much less the compound and combined power of all these active *materies morbi* and causes of disease, concentrated, particularly in crowded and close places, where tobacco smoke with other forms of malaria are usually so common.

Further evidence of the spontaneous origin of diphtheria is afforded by the observations, experience, and experiments of various scientists, notably recently

of Drs. Wood and Formad, thus presented in the *Philadelphia Ledger*, among the views of prominent physicians of that city, upon the subject, collected by visiting reporters thereto.

"Dr. Horatio C. Wood, of the Faculty of the University of Pennsylvania, and one of the Philadelphia scientists who has made a special study of diphtheria, was also visited and cheerfully furnished the following facts relative to the subject. Several years ago Dr. Wood and Dr. Henry F. Formad, under the auspices of the National Board of Health, entered upon an elaborate investigation into the nature of diphtheria, and in his conversation with the *Public Ledger* representative he frequently referred to the points presented as having been the results of the joint labors.

"'We find that there is always present in the membranes a small microscopic plant, and that in some cases of the disease, with violent fever and other general disturbances, this plant forces its way through the lymphatic vessels of the neck into the blood vessels and attacks certain parts of the blood, grows in the kidneys, marrow of the bones and in some other of the internal organs. We succeeded in producing diphtheria in the lower animals with membranes from the throats of children who had been afflicted; then rubbing up the membranes with water and filtering out all solids, found that the water was not capable of producing the disease in animals, but that the solid particles left after the filtration contained the poison. It was also found that the plants escaped in an isolated condition with the urine from the kidneys, and that thus isolated it acts as a deadly poison, producing diphtheria in the lower animals. We also succeeded in cultivating the plant entirely

away from any animal body, and, by the third or fourth generation of the plant, produced diphtheria in the lower animals. The disease as it was produced in the lower animals resembles exactly the disease in man. It is contagious, produces membrane, and the animal dies with symptoms similar to those of a sick child.

"'The various veterinary surgeons,' continued Dr. Wood, 'have from time to time asserted that it occurs spontaneously in animals, and that it may be passed from the lower animals to man. Dr. Formad once observed such an epidemic among rabbtis, and a number have occurred in which dove-cotes in Belgium have been visited and the birds destroyed by the disease. I have known cases in which there was reason to believe that children contracted diphtheria from handling cats which suffered from the disease in a mild form.

"'A very careful study of an epidemic among calves was made by the head of a Hanoverean College of Veterinary Surgery. The calves were believed to have contracted the disease from a child of the hostler of the inn who died from it. The disease attracted so much attention that a professor was sent for, he found a large number of calves sick, proved that the disease was contagious, and advised the veterinary surgeon in charge to apply remedies to the throats of the calves as in cases of human diphtheria. In four or five days the local veterinary surgeon was seized with diphtheria, and suffered from a violent attack. The person who followed him in applying the remedies to the calves was similarly affected, but the attack was less virulent.

"'It seems, therefore, well established that it is possible for diphtheria not only to pass from men to animals, but from animals to men. A curious instance of such passage was met with by Dr. Formad and myself, during our researches. In the woods of Michigan an isolated household was attacked, and the slops from the sick room was thrown into the pig-sty and devoured by one of the pigs. This pig sickened and died. At the autopsy the stomach was found to be covered with a dense diphtheritic membrane, which was full of the plant peculiar to the disease. The blood, kidneys and other vital organs were also full, precisely as in the cases of children who have died in malignant diphtheria. This case is important as being in accord with experiments which show that the plant has little tendency to enter the blood primarily, but finds its first lodgment in the throat or some other part, and afterwards enters the blood through the ulceration of the part.

"'Diphtheria is, therefore, in the majority of cases,' Dr. Wood went on to say, 'primarily a local disease, and is to be arrested by local treatment. Another important fact which we have arrived at was that the plant of diphtheria is not different in kind from a plant which is always present in the mouth of healthy people, but that, under certain conditions, this ordinarily harmless plant begins to grow with great rapidity. In its ordinary condition it has little tendency to grow, and is not noxious, because it is inert. During its active stage it is injurious, because it continually tends to develop itself at the expense of the animal in which it is. It is evident that the condition which favors the passage of the plant from the inert to the active

condition may exist inside the body of a person, or may exist on the outside of him. In our studies it has become very apparent that such towns as Williamsport and similar centres in lumber districts are especially proven to suffer from extraordinarily violent epidemics of diphtheria, and this seems to depend upon the presence of great masses of sawdust. In Michigan, a large town in the winter of 1880–81 was visited by an epidemic which was confined to those wards that were built upon a ground made by filling up a swamp by sawdust. The public schools were broken up, but one-eighth of the children were said to have died. In such localities, I believe, with Dr. Formad, that the conditions favorable to the growth of the plant exist outside of the human system. It passes from the inert to the active condition, so that the air becomes full of the poison and an epidemic results. On the other hand, a weak, sickly child gets a cold and a sore throat. The plant in its mouth, in an inert condition, finds exudation and tissues of low vitality, excessive warmth and all the conditions stimulating it into activity. The plant thus favored passes from an inert into an active condition, and the result is that a simple sore throat is converted into diphtheria. In the first case mentioned an epidemic has arisen; in the second, a self-generated diphtheria. The plant, which has in the mouth of the child passed from the inert to the active condition, escaping from the mouth is ready to grow and produce diphtheria in the throat of the second child; so that the diphtheria which has originated spontaneously is contagious and may finally give rise to an epidemic.

"'The plant does not differ from a similar organism found in putrid wounds. If it alights upon a sore

finger or any wound it produces disease at that point. Many physicians and nurses have lost their lives by sloughing wounds produced in this way. We believe, therefore,' continued Dr. Wood, speaking for himself and Dr. Formad, 'that diphtheria is nothing more or less than that which was called forty years ago, 'putrid sore throat."

"'The fact that the plant escapes from the kidneys in so active and virulent a condition and in such masses shows the importance of disinfecting the discharges at once in all cases. The vessels should have the disinfecting material placed in them before use, so that if possible the plant should be killed immediately. The researches at the University of Pennsylvania show that while carbolic acid, arsenic and many other substances have the power of killing, there is no ordinary agent equal to corrosive sublimate. It should be borne in mind that carbolic acid is not less poisonous than corrosive sublimate; it has taken life in 1½ minutes. Corrosive sublimate, in proportion to its power over the organism, is less dangerous than carbolic acid, and probably a solution of the former, to which some mal-odorous substance is added to prevent its being taken by mistake, would be a safer and more efficient disinfectant than carbolic acid.

"'What has been said shows the supreme importance of very careful attention to all cases of sore throat in children, especially weakly children. The child is only more apt to suffer from diphtheria than the adult because the membrane of the throat is more tender, more readily becomes inflamed, and is more easily penetrated. The great check to the growth of the diphtheria organism is always the vital power of the

tissues opposing it. A weakly child has lower resistive power in its tissues; owing to such low resistive power a sore throat in a child of that character is very prone to become diphtheritic. The second point alluded to is the great importance of local treatment of the throat. This should have two objects: First, to subdue the inflammation and check the sore throat, and second, to kill the plant. The general treatment of children should have for its object the destruction of the plant within the body, but no agent is known which is poisonous to the plant which is not also poisonous to the child, and therefore it can do little good to kill the plant if at the same time the patient is destroyed. All that can be done is to sustain the child, as to increasing its resistive power. It is a battle between the life of the child and the life of the organism. Unfortunately we cannot take life from the organism, but we may add life, force, or vitality to the child, and in some cases this addition may be sufficient to decide the fate of the conflict in favor of the child.

"'The relations of diphtheria to scarlet fever,' continued Dr. Wood, 'also have great light thrown on them by the results obtained at the University. The membrane in the throat of a scarlet fever patient contained myriads of plants—micrococci—precisely like those of diphtheria, and in the blood of some cases of scarlet fever there is finally an abundance of these plants, which are also to be found in the kidneys and other organs. In malignant measles the same plant is found in the throat and in the blood finally. It is plain that this plant, always being in the mouth, is ready always to pass from the inert to the active condition. A child gets scarlet

fever and an inflammation of the throat follows. The diphtheritic plant begins to grow, and it may be that finally it becomes very active, produces a diphtheritic disease, enters the blood and kills the child. The child may have escaped the first evil effects of scarlet fever poisoning to die of diphtheria, which is secondary to the scarlet fever, an indirect effect of scarlet fever poison. We believe that in many acute diseases the cause of death is this secondary septic poison. A curious element of prognosis has been made out in the course of our study as important in all the diseases. So long as the white corpuscles of the blood are not attacked by the organism, the chances are favorable to the patient, but whenever the microscopic examination shows the presence of the organisms in the white corpuscles the chances are greatly against the patient, however unimportant other symptoms may seem.'"

"Dr. Henry F. Formad, of the University of Pennsylvania, expressed himself against the prevailing view that diphtheria is a direct contagious disease, although he admitted that clinical evidence often indicated a diphtheritic contagion. He had repeatedly observed spontaneous diphtheria in animals and in many instances in man. Experimental evidence was also not in favor of the contagiousness of diphtheria. From his observations he rather believed that similar exposure, habits, surroundings and conditions of life, and not the actual transmission of a poison, were the agencies at work through which a number of individuals in one house, or of one street, or a whole community, become attacked by diphtheria.

"From his experiments, in conjunction with Prof. H. C. Wood, under the auspices of the National

Board of Health, he had come to the conclusion that every case of diphtheria was a primary origin and a local disease, and only secondarily becoming constitutional. He believed that diphtheria was merely a putrid sore throat, either without or with secondary blood-poisoning, and only in the latter case leading to a fatal termination. Death, however, also may ensue from suffocation, this being occasionally brought on through the mechanical blocking up by false membranes of the windpipe. The secondary blood-poisoning in diphtheria he considered to be due to the introduction of minute round fungi (micrococci) into the blood.

"These micrococci exist in countless numbers upon the mucous membrane of every healthy individual, but they acquire a morbid life activity if bred in the purulent exudate of an intensely inflamed throat, and gain easily entrance to the system by means of the blood-vessels and lymphatics, which are torn open in the local sloughing ulceration. Diphtheritic inflammation and exudates occurs in various parts of the body, and may complicate any ulcerating wound without doing any harm if attended to well, locally. On the other hand, any intense simple inflammation in the throat (particularly that of tender children), with its numerous lymph-glands, blood-vessels and absorbing channels, may lead to the formation of a false membrane, and finally to that fatal constitutional malady called diphtheria. When occurring in the windpipe it is designated as croup, and it is here that death from suffocation is common usually long before any constitutional symptoms from blood-poisoning can develop. Pathologically, croup and diphtheria are identical; clinically they differ; on account of the

anatomical peculiarities of the parts affected the symptoms and terminations are of necessity at variance. Concerning treatment Dr. Formad did not express any opinion, leaving this to practicing physicians. Moreover a variance treatment may be indicated in each individual case. He considered, however, local treatment of supreme importance; the object of local cauterization being to transform a putrid sloughing surface into a healthy granulating one, which, under proper hygienic measures could heal. Such means judiciously applied can, if successful, prevent the absorption of septic matters into the system."

Furthermore, it is stated in the *Journal of the American Medical Association*, that, according to the remarks of Dr. H. C. Wood, at the recent meeting of the Pennsylvania State Medical Society, in relation to diphtheria and micrococci, besides this microphyte "in the ordinary natural saliva of every person's mouth that cannot be distinguished from the micrococcus of the most malignant diphtheria," being "as far as could be discovered identical. The same micrococci were found in great abundance in cases of puerperal metritis, sloughing sores, and gangrenous wounds, from which he infers that diphtheria is not a specific disease, but simply a putrid or septic sore throat, of greater or less severity in different cases. This is returning very nearly to the opinions derived from clinical observation fifty years since."

It is thus seen that the same microbes exist in both health and disease of various kinds, and their relative degree of development, activity, and innocuousness or malignancy depend upon the character of

the soil most favorable for their evolution and energy, both within and without the living organism. Now, as ammonia is constantly engendered more or less freely in the earth, air, and vital economy, and is the common basic food of plants from the smallest to the largest, while it is both frequently produced and introduced in excess within the living system, it is most probable that the development, activity, and malignancy of these parasitic microphytes depend upon the ammoniacal condition of the fluids and solids of the body, which thus affords within itself the basic pabulum, materies morbi, predisposing and exciting causes of all such malignant microzoa and diseases, as manifested in diphtheria, angina maligna, scarlatina, typhoid, ship, yellow, enteric, puerperal, and other septic fevers, with small-pox, erysipelas, cholera, and correlative maladies, as well as the more contagious and mephitic types and complications of all other diseases—local and general, many of which are ordinarily of a mild, incorrupt, and non-infectious character, but become putrescent, malignant, and contagious, whenever this ammonæmia and super-alkalinity of system results.

Thus, there is identity of cause with multiple diseases, or autogenesis of both materies morbi and morbidity, with autosepsis, autoinfection, adynamia, malignancy, zymosis, and contagion, variously manifested and complicated.

This ammoniacal state of the fluids and solids of the vital economy is thus doubtless, in fact, the basis and underlying complication of every form, variety, and grade of disease—functional and organic, acute and chronic, local and general, of a scorbutic, necræmic, septic, zymotic, contagious, mephitic, and putrescent

type, as it supplies the essential pabulum for the development of microzymes, toxic, and contagious principles, the degree of activity and malignancy being proportioned to its preponderance, and production, or retention, and introduction into the system, while the special variety, specific contagia, and manifestations, depend upon secondary and extraneous conditions of a chemical, mechanical, dynamical, and organic character, intrinsic in, or extrinsic to the vital economy.

While thus this ammoniacal and superalkaline dyscrasia may originate and increase the virulence of all the malignant forms of disease, it also often complicates, intensifies, and corrupts all other diseases of an ordinarily benign character—both local and general. Thus by its irritant, solvent, toxæmic, septicæmic, and dissolutive action, it increases the tendency to, and complexity of, inflammatory, hæmorrhagic, albuminous, lymphoidal, serous, and purulent degeneration, disorganization, colliquation, and extravasation in general. For instance, in small-pox augmenting the pyrexial, necræmic, septicæmic, confluent, and purulent disposition, deliquescence, and malignancy, with, likewise, the same in all the exanthemata, and correlative maladies. While, in angina, bronchitis, pneumonia, consumption, and cognate affections inducing the same general typhoidal diathesis and dissolutive disposition, with spticæmic, hæmorrhagic, gangrenous, suppurative, and purulent tendency. Likewise in cerebritis, cerebro-spinal meningitis, gastritis, hepatitis, enteritis, metritis, nephritis, phlegmasia dolens, and other internal with external phlegmasiæ, causing a similar toxæmic, pyæmic, gangrenous, and disorganizing type, which

are also manifested in the minor disorders of the surface in carbunculoid furunculi, erysipelatous wounds and abrasions, bruises, burns, injuries, punctures, and scratches, that otherwise would be mild and readily heal, with various purpuric, hæmorrhœal, albuminoid, serous and choleraic defluxions within the interior as well as from the surface of the body, and intestinal, renal, vaginal, and other tissues and passages. Indeed, it thus gives a scorbutic, necræmic, septic, erysipelatous, infectious, and malignant type to every form and variety of disorder, from the simplest pimple, bruise, abrasion, or lesion—internal or external, up to the gravest diseases. Thus, in fact a general depraved cachexia and tendency is thereby excited to scorbutic, toxæmic, septic, necræmic, contagious, congestive, apoplectic, hæmorrhagic, albuminous, uræmic, anasarcous, serous, eczematous, erysipelatous, gangrenous, purulent, mephitic, and disorganizing forms of disease—both general and local. Hence, in all such ammoniacal and superalkaline diatheses and complications, ammonia and its compounds are necessarily contraindicated, the opposite neutralizing, antalkaline agents being essential to subvert and counteract its toxic, morbific, and dissolutive effects.

With regard to the relation of ammonia to bacteria and contagious affections, Dr. Geo. M. Sternberg observes in his report to the National Board of Health (*Sanitarian*, Dec. 6, 1883):

"The term albuminoid ammonia much used in the analysis of air, as well as of water, has usually represented a whole series of unknown factors.

"It was first noticed by Gay Lussac that all the nitrogen of organic matter, when heated with caustic

hydrates, appeared as ammonia. Albuminoid compounds, when disorganized by the growth of the lower forms of organisms, set free ammonia, and the quantity of the freed ammonia may in a general way, serve as a standard to indicate the amount of decomposition which *has* taken place.

"The term albuminoid ammonia, on the contrary, stands for the quantity of nitrogenous material in air and water which may serve as food for the growth of these infinitesimal organisms. This as yet undecomposed organic matter is not by any means in itself necessarily hurtful, although always objectionable. Combined with moisture at ordinary temperatures, it furnishes the condition for bacterial growth and may prove sufficient for the development and spread of an epidemic of some one of the class of contagious diseases. We can have no chemical test for discriminating between hurtful and harmless organic matter, since the poisonous infection is *vital*, and where found must be looked upon with suspicion."

But, it is obvious, that these microzoa cannot be developed or exist without their essential nutrient material for organization and support—ammonia or its nitrogenous equivalent, and according to the abundance of this so will be their increase, activity, and power; and, *per contra*, its absence or diminution will proportionably prevent the appearance and limit their growth and energy, so that they must necessarily be secondary and subordinate factors of this basic ammoniacal source of disease, infection, and dissolution. Yet, even admitting the primary action of microzymes in the production of ammonia and zymotic diseases, a safe and appropriate chemical treatment will both neutralize this alkali, starve and

kill them directly and indirectly, as well as resolve their morbid concomitants, thus nullifying the basic and initial factors of these pestilential and allied diseases, with the concomitant infectious principle and microbes, and the so common complication of the same malignant pathogenic causes with the usually benign abnormities, which thereby render them likewise infectious and destructive when they would otherwise remain innocuous.

Further evidence of the spontaneous origin, basic chemical nature, and identity of the primal ammoniacal cause of all zymotic, septic, malignant, infectious, and cognate diseases, might be largely adduced, such for instance, as are presented in an interesting paper on the "Community of Origin of Diphtheria, Typhoid Fever and Scarlatina," (*Journal American Medical Association*, August 30, 1884), by Dr. E. O. Bardwell, of Malone, Ill., which, he says, "appear to me to support the proposition that these three disorders owe their origin to a common source, that the same nidus may cause at one time the evolution of one malady, and at another time of a different one. What the peculiar predisposing force consists of which favors the production of one disease in preference to another, it is impossible to say, although various hypotheses with pages of text to support them might easily be written."

The examples presented are too lengthy for quotation, but they all tend to prove the causal identity of origin and spontaneous development of diphtheria, scarlatina, and typhoid fever in isolated hamlets, apparently induced by insanitary conditions within and about the dwellings, engendering ammonia, malaria, and infectious matter, far away from any secondary sources of contagion.

He further observes "judging from these cases I cannot arrive logically at any other conclusion than that these diseases are originally caused by disregard of the laws of hygiene. Their spread after development is another question entirely, and one with which we have at the present time no concern more than to venture the remark that the innocent inevitably suffer with the guilty; the person whose doors are kept clean suffer the penalty of allowing their neighbors to live in ignorance of plain sanitary laws. If improper sanitation is the primordial factor in the evolution of these disorders, then it is not so important to ascertain in just what form and by what means disease is disseminated, as it is to strike at the root of the evil, to annihilate the first cause, without which there can be no elements of disease to be carried about by the air, by innocent micro-organisms, or by distinct varieties of minute life created for this special purpose."

Other examples might be cited of similar spontaneous development of pestilential diseases, for, as correctly observed by Dr. N. S. Davis (*Ibid*), "It would be easy to find thousands of isolated farmhouses resting upon soil impregnated with the drippings of the kitchen, the cesspools, and the barnyard, and in which typhoid fever, diphtheria, scarlatina, etc., are almost annual visitors." These predisposing, and often also exciting causes of ill health and disease of various kinds, even of the most malignant type, are largely avoidable, for "it would be a comparatively easy task for a large proportion of our farmers and inhabitants of villages, to turn all the contents or drippings of the cesspools and barnyards, through drainage pipes to neighboring cultivated fields, where

it would increase the harvest in the very act of undergoing effectual epuration. . .. . . For say what we please about the seeds or germs of disease and the laws of their diffusion, it is certain that none of them thrive well in impure air accompanied by pure water and a clean soil."—(*Ibid.*)

But, even after all these general impurities and sources of ammonia, malaria, disease, and pestilence are removed, there still remains the active, ever-present, insidious, special factors of morbidity, corruption, and death from vicious habits and personal contamination of the people themselves, many of whom not only poison themselves but others, for, despite the utmost efforts to keep the blood and body pure and clean, any one may be befouled and suffer from the pernicious practices and toxic emanations from those who disregard the laws of health, and the rights of all persons to be free from enforced pollution, sickness, affliction, and death, which baneful infliction is so markedly exemplified in the general production and diffusion of that most noxious and disease-generating tobacco miasm by smokers almost everywhere in public as well as in private, without the least regard for the rights, health, and lives of their fellow-beings, and which can only be obviated by a rigid observance and enforcement of *personal* with public sanitation.

Moreover, decomposing nitrogenous matter and doubtless also ammonia favor the formation of those lately discovered poisonous alkaloidal substances termed ptomaines, which were thought at first to be exclusively of cadaveric origin, but as stated by R. N. Wolfenden, M. B., Lecturer on Physiology in the Charing Cross Hospital Medical School (*Lancet*,

and *Journal American Medical Association*), "Investigations are rendering it more and more probable that alkaloids of a poisonous nature occur in certain pathological conditions, and possibly also normally as a product of change of living tissue. Selmi supposed them to be products of putrefaction of organized nitrogenous material.

"There can be no further doubt that these bodies are largely produced in the process of decomposition of nitrogenous or proteid tissues. There are many varieties of them and they vary much in their nature, according as the length of time after death is long or short. Stinking fish, bad meat, etc., all contain poisonous principles which can be extracted after the manner of ptomaines. The gastro-intestinal irritation and profound toxic symptoms produced by the ingestion of bad food are probably at the bottom processes of alkaloidal poisoning. By decomposition of neurin and albumin toxic bodies may be obtained much resembling muscarin. Both from freshly prepared peptone made by the action of gastric juice on pure fibrin, and from stinking peptone by boiling with caustic soda, evaporating, extracting and purifying, toxic alkaloids can be obtained which kill frogs and rabbits in a few minutes. Putrefying casein, brain substance, liver and muscle also yield these products.

"These ptomaines are met with as a constituent of normal tissues or juices. In this case they are products of tissue metamorphosis." They are also found in the saliva and urine. Likewise "in certain pathological conditions. In the urine of patients suffering from progressive paralysis there are two volatile bases, the one like nicotin, the other like coniin. In the urine voided during a case of interstitial

pneumonia were two alkaloidal bases one having the odor of stinking fish, the other of ammonia. Two similar bases were found in the urine of patients with abdominal typhus. In tetanus a base like coniin was discovered in the urine. In the urine of 'miliary fever' an alkaloidal base having the odor of stinking fish has been observed.

"Some of these ptomaines are not poisonous, but most possess strongly toxic characters, and cause profound symptoms when injected under the skin, such as paralysis more or less complete, of hinder extremities, dilatation of pupils, convulsions, muscular flaccidity, slowing or acceleration of the heart, loss of cutaneous sensibility and of muscular contractility, possessing many of the characteristic physiological actions of muscarin or atropin. They answer to nearly the same reactions as the vegetal alkaloids."

It is thus seen that an ammoniacal, superalkaline, dissolutive, and corrupt state of the living organism is not only favorable for the development of microzymes, but also a class of poisonous alkaloidal substances, and doubtless likewise of the most virulent forms of contagia as well as of the milder varieties of infectious and toxic matter, with the spontaneous origin of all the varied zymotic, septic, contagious, and mephitic maladies, with the scorbutic, typhoid, infectious, and putrescent complication of all the minor and ordinarily innocuous disorders—both general and local, internal and external, of every grade and character, for while this primal obnoxious and morbific agent—ammonia, is thus always the same, the secondary and complicating poisons and concomitants, or contagious principles, pathogenic influences, and morbid states may vary indefinitely according to special conditions and complications.

These considerations are of paramount importance for the correct appreciation of the ætiology, pathology, and treatment of all diseases of every form and nature, contagious and non-contagious, and especially of that infectious, malignant, and destructive variety of which diphtheria is a type. Without therefore, disregarding the presence of microzymes with toxic and other subordinate concomitants in diphtheria and correlative diseases, yet in the prevention and treatment thereof they should be regarded as of secondary rather than of primary importance, while special effort should be made to subvert the basic chemico-organic and dynamic morbific factors, and particularly the primal ammoniacal pathogenic substratum, with, at the same time, destruction of infectious and toxic matter, extinction of the parasitic micro-organisms, and other probable causes of zymotic, contagious, and septic diseases, as true sanitation and therapeusis require extirpation of *all* elements of disorder or pathogenic causes—primary and secondary, with the use of *all* means of preserving and restoring health in the most certain and positive manner. What these specific measures are we will now proceed to show in the prevention and treatment of diphtheria, typhus, and all other zymotic, septic, infectious, scorbutic, putrescent, mephitic and allied diseases.

III.

TREATMENT.

While in general *a priori*, it would not seem probable that any single remedy or class of agents would prove specific in the cure of diphtheria, typhus, remittent, and other malarial, zymotic, septic, contagious, scorbutic, putrescent, colliquative, and cognate diseases, especially with widely diverse local lesions, from their apparently distinct and complex pathology and the consequent varied indications for their treatment, yet investigation and experience prove that such is largely the case. It is thus shown that there are single agents and a class of substances that prove more or less specific in the prevention and cure of these infectious and malignant diseases, by their disinfectant, antitoxic, antizymotic, antiseptic, antalkaline, neutralizing, resolving, and restorative properties, in destroying, nullifying, and subverting the morbific principle and underlying conditious upon which their occurrence and existence depends, and thereby jugulating the basic ætiological factor *ab origo*, as well as aborting and resolving its morbid sequelæ. From the preceding exposition of the the basic ammoniacal, superalkaline and toxæmic ætiology and pathology of these diseases, such specific remedies and treatment would naturally and logically be indicated in the antalkaline, neutralizing, disinfectant, antiseptic, antizymotic, antiscorbutic, resolving, and restorative agents included in the class of *Acids*, vegetal, animal, and mineral, of which the last are in general the most active, and, independent of all such

ætiological and pathological considerations, prophylactive and therapeutic experience have shown their great practical efficiency in preventing and resolving these septic, infectious, and malignant maladies with the minor abnormal analogues. Of the mineral acids, hydrochloric and nitric acids separately, or combined in the nitro-hydrochloric acid, are the most generally efficient, though it is probable that hydrobromic acid will also prove very useful to some extent in the asthenic as well as sthenic disorders, to which latter it is most applicable.

Hydrobromic Acid is antalkaline, antipyretic, refrigerant, disinfectant, antizymotic, antiseptic, anæsthetic, antispasmodic, and resolvent, with a special soothing, depurant, and relaxing effect upon the throat, air-passages and alimentary canal, properties particularly desirable to a limited extent in diphtheria, scarlatina, yellow fever, and correlative diseases, though in general, a more invigorating treatment is required therein from their asthenic character, yet, in all sthenic stages and types of fevers, anginose, and gastro-enteric affections, with allied conditions this agent is strongly indicated.

"Like the bromides it has been successfully employed in a variety of nervous disorders induced by reflex irritation, such as *vomiting*, *cough*, *muscular spasm*, *whooping-cough* and *neuralgia*, and in coughs excited by *bronchial* or *laryngeal* irritation. In cases also of *cerebral hyperæmia* due to excessive mental activity in study, business, etc., it appears to have the same influence as the bromides. In *tinnitus aurium* and other subjective sensations in the ear, especially those of a throbbing or knocking character, depending upon vascular congestion, the medicine has

proved very efficient."—(*National Dispensatory*). Of the dilute acid, dose from thirty minims to one fluid drachm in sweetened water or other appropriate vehicle, taken through a non-corrosive tube, as indicated, it being caustic in a concentrated state like its analogues.

But, chlorine alone, or in some of its combinations, if not the best, is certainly a most powerful disinfectant, antalkaline, antiseptic, and germicide, with other active sanative properties, especially in the form of acids, and, for internal exhibition is most generally applicable and efficient in hydrochloric and nitro-hydrochloric acids, a brief *resumé* of the medical properties of which we will present in order to show more clearly their special value in the prevention and treatment of diphtheria, typhus, ship, yellow, malarial, and other fevers, with small-pox, scarlatina, and all other zymotic, septic, contagious, mephitic, putrescent, and scorbutic diseases.

Hydrochloric Acid. Strong muriatic acid is a powerful escharotic, hence must be freely diluted for internal use. It is antalkaline, disinfectant, antiseptic, antizymotic, refrigerant, febrifuge, resolvent, tonic, depurant, alterative, digestive, mild cholagogue, secernant, and laxative. It allays thirst and fever, improves the tone of the digestive organs, liver, and bowels, promotes digestion, nutrition, secretion, and defecation, purifies the blood, destroys noxious substances within, and favors the elimination of effete matter from the body. It is an efficient germicide, and "is regarded by Dr. Paris as an effectual preventive to the generation of intestinal worms," (*Waring's Practical Therapeutics*), who also "has given it with success in malignant cases of typhus and

scarlatina administered in a strong infusion of quassia. It may also be added with advantage to infusions of colombo, gentian, and cinchona. It proves a good adjunct to gargles in ulcerated sore-throat and scarlatina maligna."—(*United States Dispensatory*).

"In *Typhus and Typhoid Fevers*, the internal use of Hydrochloric Acid appears to prove highly serviceable. In an epidemic of Typhus Fever which prevailed in Stockholm in 1841–2, Prof. Huss states that this acid was the most relied upon, particularly in cases attended with cerebral symptoms. He employed a mixture composed of f℥j of the acid in f℥xij of decoction of Mallows, in doses of a tablespoonful every two hours. It was given in the earliest stage (after a purgative) and persisted in so long as the pulse continued full, firm, or compressible, and the sounds of the heart remained normal, or the first sound shorter than in the natural state. Its employment was not contraindicated by the state of the tongue, or of the gastric organs; it was given whether the tongue was loaded or not, red and fissured, moist or parched; it was given also whether the abdomen was painful or not, tense or flaccid; in constipation and in diarrhœa. *The sole contraindication* of its use was bronchial or pulmonary congestion, which was aggravated by it. Phosphoric acid was substituted when the pulse began to lose its fulness. Fordyce, Paris, and others bear testimony to its great value."

"*In the continued Fevers of Children*, it appears to have a beneficial influence. . . . . In scarlatina, Dr. McSherry speaks highly of Hydrochloric Acid in doses of gutt. j–iij, largely diluted. He regards purgatives as injurious." (*Waring's Practical Therapeutics*).

As muriatic acid promotes the action of the stomach, liver, and bowels, purgatives in conjunction therewith are generally unnecessary, and often detrimental in the exanthemáta and morbid conditions to which it is applicable, though laxatives may sometimes prove useful in moderation, while in gastro-intestinal fluxes, except in conjunction with iron and other constringents, it is mostly contraindicated, the astringent acids being more appropriate therein.

Hydrochloric, in combination with Nitric acid forms a most powerful and valuable medicinal agent, and as nitric acid is of itself a potent remedy in like diseases, we will premise some general observations thereon, before treating of this compound acid.

Nitric Acid, in a concentrated state is powerfully caustic, but when properly diluted is a safe and efficient medicament. It is antalkaline, disinfectant, antizymotic, antiseptic, antiperiodic, antipyretic, refrigerant, febrifuge, alterative, resolvent, sialagogue, cholagogue, secernant, laxative, and tonic. It is especially useful in intermittent, with all malarial, putrid, infectious, and other adynamic fevers, whooping cough, constitutional syphilis, chronic hepatitis, torpid liver and concomitant constipation, chronic affections of the spleen, and inactivity of the secretions and system in general.

"If continued for a long period it causes salivation; it has also apparently a more direct action on the liver than other acids, but it disagrees with the stomach sooner than Sulphuric Acid. It is an excellent alterative after long courses of Mercury, renovating the strength, and improving the tone of the system in a remarkable manner. As it acts injuriously on the teeth, any medicine containing it should be sucked

through a quill or glass tube, and the mouth should be rinsed out with an alkaline solution after each dose."—*Waring's Practical Therapeutics.*

Nitric acid is especially applicable in diphtheria, cynanche maligna, scarlet, bilious, remittent, typhus, ship, yellow, and other fevers, with small-pox, the exanthemata, septic, infectious, and putrescent diseases generally, both constitutional and local. It is very useful as an application to hæmorrhoids, indolent, phagadenic, gangrenous, and sloughing ulcers, particularly cancrum oris, and like ulcerations of the mouth, gums, and throat, in full strength or diluted as required. In doses of from five to twenty minims of the dilute acid in three or more fluid ounces of sweetened water or lemonade it forms an excellent acid drink, and, at the same time, serviceable disinfectant and stimulant lotion for the oral and faucial surfaces, as well as the gastro-intestinal canal, especially applicable in local complications thereof, with septicæmia and systemic atony, as in diphtheria, or malignant anginose affections, bilious, yellow, and other fevers, with similar disorders, both contagious and non-contagious.

Nitric acid is very active as a fumigating and disinfecting agent, yet not considered equal to chlorine, though in its absence, or in conjunction therewith and chlorinated compounds it may be resorted to with advantage. The fumes are readily evolved by pouring sulphuric acid upon nitre in an earthen dish upon heated sand. It is, however, in combination with the hydrochloric acid as nitro-hydrochloric acid, that it is of superior value, as this combines the most useful properties of its constituents with additional ones of greater utility both in medicine and the arts.

in connection with the other mineral, animal and vegetal acids, and doubtless with as decided beneficial effects in the former as in the latter.

But, while perhaps, I have applied this acid treatment most generally and freely from the theory of the chemico-organic, ammoniacal, or superalkaline origin of these scorbutic, zymotic, septic, contagious, putrescent, and correlative diseases, and present it as the true basic and specific treatment therefor, its value does not rest upon my own limited experience alone, as the correlation of the superalkalinity of the blood with low fevers and the usefulness of the mineral acids in their treatment, has long been recognized to a certain extent.

Thus, according to Dr. Headland (*Action of Medicines*), "The natural alkalinity of the blood is due to the presence of free Soda and Ammonia." . . . "A free acid may act as a Restorative in cases where there is an excess of alkali in the blood. It may either remain in the blood after entering into combination, or it may pass off by the urine, supplying there the place of a natural acid, which it leaves behind in the system. It is on such a theory as this that the action of mineral acids in typhoid and putrid fevers has been explained. Huxham long ago recommended acids to counteract the 'putrid crasis,' in fevers. They are certainly sometimes of marked service in these disorders. Dr. Murchison recommends the treatment of Typhus and Typhoid fevers by mineral acids. Of 230 cases of continued fever in St. Mary's Hospital, Dr. Chambers treated 109 on 'general principles,' 121 with Hydrochloric acid. Of the 109, 23 died; of the 121 only 4 died. 'Continuous liquid nutriment,' of beef-tea and milk was given along with the

Hydrochloric acid, (*Med. Chir. Soc.*, April 28, 1863). Dr. Henderson found at Shanghai that the mortality from continued fever was reduced by the employment of the acid from 28 to 7 per cent. (*Medical Times*, March, 1863). Mr. Day, of Stafford, has found nitric acid of great use in malignant scarlatina. In the Yellow fever of tropical climates, an excess of alkali was discovered some years since by Dr. Blair. This alkali seems to be Ammonia. I do not affirm positively that there is in all of these fevers an excess of alkali in the blood. Although likely, it is not proved. The explanation is plausible."

Yet, this superalkalinity of the blood, mainly from Ammonia in these septic, contagious, and adynamic diseases, is almost positively demonstrated both experimentally and therapeutically, as well as in their ætiology and pathology, from the free natural evolution of this alkali within the body, and its artificial introduction from without into the system, with the well-marked and specific effects of the acid treatment therein. Besides other evidence which might be adduced, this was clearly exemplified in seventeen or more cases of Ship Fever which came into the Philadelphia Hospital under my care at one time. These patients were seriously ill, spotted with the maculæ of typhus, and so offensive and contagious that it was dangerous to go near them, yet with the free administration of mineral and vegetal acids—nitro-hydrochloric acid being the principal, they were soon disinfected, purified, revivified, and restored to health, every one recovering, except one brought in moribund and dying before treatment could be instituted.

Dr. Waring states (*Practical Therapeutics*), that "in *Typhus Fever*, the mineral acids have been recommended in all countries from the days of Forestus,

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Dr. Waring states (*Practical Therapeutics*), that "in *Typhus Fever*, the mineral acids have been recommended in all countries from the days of Forestus,

Sydenham, etc. The theory of their action is obscure; but as Dr. Murchison observes, their beneficial effects are undoubted. Dr. Murchison adds (*On Fevers*, 1862), that during the last few years he has used these acids in hundreds of cases, and he believes them superior to any other method of treatment, though far from ascribing to them the wonderful effects attributed to them by some writers. He states that he usually commences with the hydrochloric (℥xx) and nitric acids (℥x) every three hours, each dose being diluted with the patient's drink. In the advanced stages of severe cases, when the 'typhoid state' is well marked, he prefers sulphuric acid (℥xv–xx) every three hours, with Ether and small doses of quinine. He states that he has often observed marked improvement follow the commencement of the acid treatment, at whatever stage of the fever it was prescribed, and although no wine or brandy was given with it. *In Typhoid* (*Enteric*) *Fever*, Dr. Murchison considers that no remedies are superior to the mineral acids, and that they are often of real service, though their powers have been overrated. Here he prefers the hydrochloric and sulphuric acids, ℥xv–xxx of the dilute acid every three or four hours. With each dose he combines about half a grain of quinine, believing it to be of great service, especially when the disease has anything of a remittent character."

From the general character of the disease, the nitric, hydrochloric, nitro-hydrochloric, and other acids—mineral, animal, and vegetal, are specially indicated in the prevention and treatment of yellow fever, and if given freely therein will doubtless act as efficiently as in ship, typhus, remittent, adynamic, and putrid fevers generally, with other diseases of the

same general class and nature. The mineral acids and particularly nitro-hydrochloric acid are specifically adapted to meet the varied indications in yellow fever presented in the superalkaline, or ammoniacal, toxæmic, septic, scorbutic, necræmic, and hæmorrhagic condition, pyrexia, jaundice, defective, vitiated secretion and torpor of liver, bowels, kidneys, and general economy, with thirst, sickness of stomach, tendency to black vomit, collapse and death, by neutralizing and destroying all the ætiological factors, resolving their pathological sequelæ, disinfecting and depurating the blood and body, restoring the normal chemico-organic operations, secretions, and functions of life, and refreshing and invigorating the entire system at the same time.

The dilute nitro-hydrochloric acid may be given in doses of from v–xx minims properly diluted to a pleasant acid taste. In water, lemonade, infusion of barley, or other mild acidulous and bland liquid, sweetened to taste, it forms an acceptable, antalkaline, disinfectant, antiseptic, nutrient, restorative, and refreshing beverage, very agreeable and invigorating to those suffering with scorbutic, malarious, bilious, septic, febrile, infectious, and mephitic affections. As a nutritive diluent to promote its efficiency and increase the ingestion of acid, I usually give it with the juice of one lemon, in a goblet of sweetened water or other menstruum, as freely as required and the stomach will bear. To protect the teeth, it should be taken through a glass, porcelain, straw or other non-corrosive tube, and the mouth rinsed out subsequently with lime, or other alkaline and plain water, though in edentulus children and adults it may be directly taken without such precautions, its localized action

on the mouth being often desirable, always avoiding, of course, its contact with metallic spoons or other neutralizing and contaminating substances.

Phosphoric Acid, is also very efficacious in adynamic fevers and conditions and is particularly applicable when a more stimulant effect is required, and either alone or with orange, lime, lemon, or other vegetal acid juice in water, infusion of barley, lactic acid, buttermilk, coffee, tea or other appropriate menstruum, sweetened to taste, forms a very pleasant, refreshing, cooling, stimulant, restorative, tonic drink. It is especially useful in atonic conditions and low fevers, as it is antalkaline, and actively stimulates the brain, nervous, and vascular systems, while it reduces temperature, allays fever, and quenches thirst most effectually. It invigorates the general system, promotes secretion, nutrition, and depuration, and may be alternated advantageously with the more potent disinfectant and antiseptic mineral acids.

"*In Typhus and Typhoid Fever* it has been given with advantage. In the epidemic fever which appeared at Stockholm in 1842, Prof. Huss employed Phosphoric Acid in all the cases which came under his notice. He commenced its use when the pulse began to lose its fulness, and the first sound of the heart became short like the second, f ℥ iij of the acid were diluted with f ℥ xij of decoct. malvæ; and of this one or two dessert spoonfuls were given every two hours."—(*Waring's Practical Therapeutics*).

But if necessary phosphoric acid may be exhibited more frequently and freely, being careful not to overstimulate the brain, as it has a special tendency thereto, and may be generally employed, either alone

or in combination, as phosphate or lacto-phosphate of iron, quinia, strychnia, lime, and soda, according to special indications, whenever a stimulant, tonic, anti-scorbutic, antiperiodic, and restorative is required. As a refrigerant, febrifuge, assuager of thirst, secernant, resolvent, depurant, stimulant, tonic, and restorative, or invigorant of mental, nervous, muscular, and general vital energy, phosphoric acid and its compounds are far superior to alcoholic liquors of any kind, which in fact, diminish secretion, excite and increase thirst, poison the blood both directly and indirectly, prevent depuration, induce scorbutic, toxæmic, irritative, and adynamic fever, with ataxia, and depress rather than increase nervous, muscular, and vital tonicity, or mental and bodily strength, ample evidence of which is presented everywhere throughout the world.

Sulphuric Acid, though powerfully caustic when strong, is, properly diluted, a safe and valuable ant-alkaline, antipyretic, antiseptic, antizymotic, disinfectant, refrigerant, astringent, styptic, and tonic. It is especially applicable in low fevers and infectious diseases, with hæmorrhages, diarrhœa, choleraic and other defluxions, as well as in the less complicated forms of the latter generally. It is particularly useful in hæmatemesis and hæmorrhage from the bowels, as well as from the lungs, uterus, and general surface, and hence is especially indicated in the gastro-intestinal hæmorrhages of yellow and typhoid fevers, with those of allied affections. In the diarrhœa of typhoid or enteric fever, with choleraic and atonic defluxions generally, it is very serviceable.

"*In the Diarrhœa of Typhoid Fever*, Dr. H. Kennedy, states, after ample experience, that by far the best

remedy is diluted Sulphuric Acid (f ʒ j to f ʒ iij ad Aq. f ʒ viij). It is best to begin with a small dose and increase it as required. The diarrhœa should not be too suddenly checked. Opiate enemas to allay tenesmus are to be used."

"*In the advanced stages of continued Fevers and in Typhus Fever*, the internal administration of Sulphuric Acid, with some tonic infusion, appears to be of great service. Prof. Huss found that when there was profound prostration, with commencing bed-sores, and persistent diarrhœa, Sulphuric Acid in combination with Infus. Rosæ or Infus. Arnicæ mon. was productive of much benefit."

"*In Confluent Small-pox*, when the pustules are filled with a bloody sanies, and the urine contains portions of broken down coagula of blood, dilute Sulphuric Acid is stated by Dr. Thompson to be a remedy of the highest value, indeed the only one that can be relied upon. Its use should be combined with wine, tonics, etc."—(*Waring's Practical Therapeutics*).

Sulphuric acid is also beneficial both constitutionally and locally, in scarlatina, ulcerated sore throat, ptyalism, colliquative sweats, cholera, choleraic affections, and defluxions generally. Mr. Buxton, of London, attested in 1851 to the "remarkable efficiency of diluted sulphuric acid," and in 1853, Dr. H. W. Fuller, of St. George's Hospital "strongly recommended it in choleraic diarrhœa, from his own experience and that of his friends in more than ninety cases without a single failure. The dose employed was half a fluid-drachm, diluted with water, given every twenty minutes in ordinary cases, every quarter of an hour in severe cases. The vomiting, purging,

and cramps usually ceased after the third or fourth dose."—(*United States Dispensatory*).

In passive diarrhœas and other defluxions the aromatic, is preferable to the simple sulphuric acid. Both may be given in the compound infusion of roses, tea, or with gallic acid, cinchona, and other tonics, in doses of from ten to thirty drops in a wineglassful of plain or sweetened water, as often as required, sucked through a non-metallic tube with the same precautions to protect the teeth as the other mineral acids.

Other acids, as sulphurous, carbolic, and salicylic acids, with their respective salts and combinations, as sulphites, sulpho-carbolates. salicylates, etc., of soda more especially, are more or less useful in zymotic, septic, contagious, mephitic, and allied diseases, but, in general, are neither so safe, convenient, efficient, or pleasant to take, as the several mineral and vegetal acids indicated, with their compounds of iron, lime, soda, quinia, strychnia, etc.

The predominent indications in the preventive and curative treatment of all zymotic, toxæmic, septic, and contagious diseases, is to avert the production, abort, neutralize, and destroy the basic morbific alkaline agent, infecting principle, and concomitant poisons, disinfect and purify the body, the *interior* as well as exterior, every particle thereof, in its *entirety*, the vital economy within itself being an active generator as well as recipient of poisonous matter and contagium, and resolve the morbid lesions and complications.

While the single elements chlorine, iodine, bromine, sulphur, etc., are active neutralizers of alkaline substances, germicides, disinfectants, antiseptics,

depurants, and resolvents, they are not so eligible to exhibit medicinally as their compounds, especially the acids, though in some conditions may be usefully resorted to for special purposes, their protective and resolvent influence in these affections being very efficient. But, in general, the acids—mineral, vegetal, and animal, are most useful as antalkalies, antiseptics, antizymotics, and for the disinfection and purification of the living organism, with other salutary purposes, particularly the citric, lactic, salicylic, carbolic, sulphurous, sulphuric, phosphoric, nitric, hydrochloric, and nitro-hydrochloric acid. The last is especially potent, not only in the milder disorders of a scorbutic, infectious, zymotic, septic, and mephitic character, but also in the most malignant and contagious, as typhus and scarlet fever, diphtheria, small-pox, and others of a like virulent type.

From many years' experience in the more or less free use of these acids, hydrochloric and nitro-hydrochloric, particularly, with the vegetal acids, in scorbutic, necræmic, zymotic, septic, contagious, and mephitic diseases generally, for it has been my custom to exhibit them freely in all such maladies, I can strongly testify to their superior value as potent antalkalies, disinfectants, antiseptic, antizymotic, febrifuge, remedial, and sanative agents, both for preventive and curative perposes in these dangerous and destructive affections so prevalent throughout the world. Thus, it is not only in those pernicious types of toxæmic and typhoidal blood dyscrasia—as in the more purely ammoniacal or superalkaline, scorbutic, necræmic, septicæmic, and infectious conditions, that these acid remedies are so markedly efficient, but also in those systemic disorders with local lesions of

various kinds from the extreme eruption of variola to the slightest local manifestation of a general superalkalæmia and toxicosis, though when these are in the gastro-intestinal canal they must be given more circumspectly, and the more soothing, conservative and astringent acids selected, as in enteric fever for instance, so as to act most favorably upon the local affection of the bowels, neutralize the superalkalinity of the blood, destroy septic and contagious matter, and depurate and support the system at the same time. Hence in typhoid fever, cholera, and like affections with gastro-intestinal lesions, the milder and more astringent acids with their compounds are most applicable, as muriatic acid, chloride of iron, phosphoric and sulphuric acids, with their combinations of phosphate of iron and lime, sulphate of iron, or the still more sedative hydrobromic acid, and bromide of iron and lime, carbolic, and sulphurous acid, and sulpho-carbolates, with their analogues, of acetic acid and acetates, etc., and corresponding vegetal acid principles, juices, and jellies, according to the special indications of irritation, inflammation, ulceration, hæmorrhage, diarrhœa, etc., to thus most specifically counteract and overcome the local with the constitutional disorder, neutralize and destroy the basic alkaline and concomitant materies morbi in the blood, tissues, and section implicated, resolve the disease altogether, and restore the healthy integrity and tonicity of both the part affected and of the general system.

But, notwithstanding this marked ammoniacal and superalkaline condition of system in typhoid fever and correlative diseases, as the primal cause thereof, it is strongly urged that ammonia is the sure remedy

for the former. Thus, in an interesting paper on the Treatment of Typhoid Fever, read at the last meeting, and published in the *Jour. Amer. Med. Assoc.*, August 16, 1884, Dr. S. K. Jackson, of Norfolk, Va., after some general observations on its pathology observes:

"Another possible, if not probable, cause of this nitrogenous waste of the system is due to the consumption of this important element by the parasitic organism which is the acknowledged ætiological factor in the production of enteric fever. That this microzoon is a nitrogen feeder, is evident from the fact that he lives and is developed in nitrogenous matters, in urea and all nitrogenous excreta. These furnish its peculiar pabulum, in them it is generated and thrives. Old timbers saturated with urea, the rotted logs of a country cabin against which men have constantly micturated, have been known to be fruitful sources of this disease. The most serious outbreak of typhoid fever I have ever known, occurred during our late war (1862), in a Mississippi brigade, who were encamped at the foot of a mountain slope where a large amount of leaf mould had been for years accumulating. This spongy mass when saturated with their urinary deposits, and probably in a state of fermentation, caused the most malignant epidemic of this disease that has ever occurred in my experience. I hope some day, to obtain access to the official records to ascertain the great numbers who fell victims to it; they are numbered by hundreds. I hope I may be pardoned for mentioning here, that of 223 cases that were taken under the treatment I am now advocating, not one died." . . . .

"If further proof be needed that this microzoon is a consumer of nitrogen, it is furnished by the am-

moniacal exhalations emitted by a typhoid fever patient, from the breath, the skin, as well as by the urine, which, when freshly passed, as is known to all, emits the odor of ammonia, like stale urine in a state of decomposition."

"These exhalations are undoubtedly due to the decomposition of the nitrogenous constituents caused by this micro-organism."* . . . .

"It is clear then that our aim should be to supply this nitrogenous waste. How is it to be done? By nitrogenous food, you will say; a very rational way of accomplishing that desirable end, were it not for the utter impossibility of digesting and assimilating this food.† There is only one way, known to me, of effecting this purpose, and that is by the free administration of ammonia, even to saturation.

"Fortunately this nitrogenous base furnishes us with salts of such different therapeutical powers that we have no difficulty in finding one adapted to any and every stage of the disease and every probable condition of the patient during its existence or progress. It supplies us in the nitrate with the most sedative salts we possess, and in the carbonate, with the most stimulant salt in our Materia Medica. The only other salts of ammonia I have been in the habit of using in the disease are the acetate and hydrochlorate, in conditions which will be presently pointed out."

Still, notwithstanding the high degree of success in the treatment of typhoid fever, with these salts of

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* Or rather, that the development and activity of the microzymes are due to the excess of ammonia, their pabulum vitæ.

† But food may be artificially digested by acids, pepsin, etc., and its assimilation promoted by oxygenating and other corroborating agents.

ammonia this alkali is obviously contraindicated in this disease, while the constituent acids of its compounds, which are usually in excess therein, are especially applicable as neutralizing, antalkaline, antiseptic, antipyretic, antizymotic, disinfectant, and corroborant agents. Besides, instead of increasing the already excessive solvent and irritant ammonia in the system and further tending to its destruction by colliquation and otherwise, as well as to augment the undue alkaline pabulum promotive of the development and activity of the parasitic microzoa, thus doubly taxing the struggling economy to expel this alkali, which is being conservatively eliminated at every pore, and resist at the same time, the destructive action of the concomitant sepsin, infection, and microzymes, a more rational method would seem to be to exhibit such agents as would subvert the production, neutralize, and counteract the ill effects of this noxious alkali—ammonia—in excess, nullify its morbific sequents, and starve and destroy the accessory microzoa, which can be most readily effected by acid, antalkaline, antizymotic, antiseptic, disinfectant, resolvent, and restorative medication and alimentation.

The general tendency of preventive and curative medicine is in this direction, and clinical experience is demonstrating that it is the only true and specific method of treatment of typhoid with all allied diseases.

Thus among others that might be cited in proof thereof, Dr. D. A. Sheffield, of Apple River, Ill., after inviting attention to *salicylate of bismuth* as presented by Prof. Henri Desplats, as "the great desideratum" in enteric fever (*Med. Record*), highly commends sulphurous acid in this class of diseases, and states

(*Jour. Amer. Med. Assoc.*), "A course of experimentation with the drug, extending through a period of more than twenty years, in almost every variety of zymotic disease, convinces the writer that its power over and adaptability to the medication of this variety of ailment has not been recognized and appreciated by the majority of the profession."

"That it is capable of modifying both the violence and duration of typhoid fever, has been demonstrated to my own and my patients' satisfaction so many times, that without the drug I should approach the treatment of a case of that disease with considerable trepidation. Given in moderate doses during the period of dry skin and parched brown tongue, its effects are often magical.

"This disease, however, is but one of the many in which *sulphurous* acid may be used both as a remedy and a prophylactic. *The acute infectious diseases are all modified, aborted, or wholly prevented by its use.*"

Bisulphite of soda has been mostly exhibited "though in a few cases a solution of sulphurous acid diluted with glycerine has been employed, giving equally as good results, but not as well tolerated by the patient."

"To demonstrate its utility use a saturated solution of bi-sulphite of soda in water, giving one teaspoonful every two or three hours until the system is brought fully under the influence of the drug; afterward one dose every six hours will be sufficient to maintain its effect."

The sulpho-carbolate of soda has also been found very serviceable in these diseases, and the corresponding salt of lime, or sulphite of lime singly, will doubtless also prove useful therein, the carbolic acid being

likewise a potent antalkaline, antiseptic, and germicide, while the lime promotes the healing of local lesions and the reconstruction of tissues. But, for this purpose the phosphate of lime with the acid in excess is most useful as a nutrient, antalkaline, and stimulant to the nervous and general system.

Iodine has also been highly commended in the treatment of typhoid fever, but, as it is a disintegrant and sorbefacient as well as local irritant, it has a tendency to promote intestinal excitement, morbid waste and emaciation, already too active, hence is contraindicated therein, and especially in combination with potassium which increases the superalkalinity, solvent, scorbutic, and dissolutive condition of the blood and body, depresses the heart, nervous and general system, and still more favors the concomitant inanition and prostration of the disease. The sodium salt is far better when a resolvent is required, and ordinarily better still the iron compound of iodine, the syrup particularly. But chlorine and bromine with their compounds are far more conservative, reparative, and applicable than iodine, in this and correlative disorders, especially in their acid form, as well as with iron, soda, and lime, the bromides of iron and lime particularly for their local soothing and healing effects upon the gastro-intestinal canal, while bromide of quinia—when the latter is required, is less exciting than the sulphate, this salt combining the mean of the valuable properties of its constituents. Yet, while hydrobromic acid is a potent febrifuge and calmative, it, with the bromides except that of quinia and its analogues, are rather too sedative for free use in this disease, as in general, a more supporting and invigorant treatment is needed therein. Hence, as a

most active antalkaline, antiseptic, refreshing stimulant, tonic, analeptic, corroborant, and restorative, phosphoric acid and the phosphates of iron and lime, with sometimes, quinia and strychnia, the latter often better subcutaneously, are invaluable in enteric fever and cognate diseases, employed judiciously according to special indications, singly or in conjunction with other remedies as required by the varying conditions and exigencies of the case. Moreover, when an actively diffusible stimulant is necessary therein, instead of the obnoxious alcoholic liquors usually so freely exhibited, the oil of turpentine is far better in every respect—internally and externally, by inhalation, deglutition, and otherwise. While for alimentary purposes, peptonized milk and lime water or sulphite of lime, with corresponding light albuminoids, and the astringent acid fruit juices and jellies form the basic and principal food, as the stomach and chylopoietic viscera are incapable of much digestive effort in this affection and cognate disorders.

Thus, the local lesions and manifestations with the systemic dyscrasia of these varied scorbutic, necræmic, zymotic, septic, contagious, malignant, colliquative, and adynamic maladies, may require a modification of this basic acid treatment, without, however, changing its essential character, with the addition of other compatible remedies to meet the special indications in the different phases and complications thereof, but all of which are more or less directly dependent upon the underlying ammoniacal, superalkaline, toxæmic, septic, and constitutional derangement. Hence, in general, the acids and their analogues, by neutralizing, subverting, and destroying the primal superinducing ammoniacal or alkaline cause and condition,

undermine, nullify, and resolve at the same time their concomitant toxic and morbid sequelæ.

Besides the many minor manifestations of its power the efficacy of this acid and antalkaline treatment is strikingly exemplified in that formidable exanthem—variola. In the virulent superalkalinity, septicæmia and toxicosis of small-pox, with the extensive eruptions on the surface of the body, the mineral and vegetal acids are remarkably efficient as antalkaline, antiseptic, disinfectant, alterative, tonic, resolvent, and curative agents. The carbolic, sulphurous, sulphuric, and salicylic acids have been thus highly spoken of in the resolution and cure of variola, with allied septic and contagious diseases. According to my own experience the hydrochloric and nitro-hydrochloric acids act as basic and specific resolvents of both the constitutional malady and local lesions in small-pox as well as in cognate abnormities, as they neutralize the superalkalinity of the organic fluids and solids, disinfect and depurate the blood and general system, destroy the septic and infecting virus, and nullify the underlying ammoniacal cause, thereby subverting the basic exciting factor of the dyscrasia, pestiferous condition and eruption, inducing their speedy subsidence, and exterminating the materies morbi, contagious principle and disease at the same time. In particular, nitro-hydrochloric acid is very active as a prophylactive and curative agent in aborting the variolous disease altogether when taken in time, and cutting it short after its inception, by neutralizing the basic superalkaline pathogenic factor, breaking up the primary fever, preventing the eruption, checking suppuration, drying up the pustules, disinfecting the blood and body, and

destroying the contagium and noxious emanations. It may be given in conjunction with lemon juice and other vegetal acids as freely as the system will tolerate, in doses proportioned to the age and necessities of the case, in solution as previously indicated. Sour buttermilk may also be taken largely as both adjunct acid medicine and food with corresponding acidulous medicaments and regimen. I believe I have thus aborted the prodromic fever of variola with this acid medication and alimentation, though of course, this is difficult to prove, as there must always remain a doubt whether it was not a casual or ephemeral fever, hence can only be settled by an extensive series of cases in hospitals and elsewhere under the most adverse circumstances. Therefore, I present this as my experience and belief to excite such a course of practical investigation for the prevention and subversion, as well as cure, of this terrible malady, though as nitromuriatic with other mineral and vegetal acids will suppress it, they should of course be able to abort it *ab initio*.

The mineral, animal, and vegetal acids, especially the hydrochloric and nitro-hydrochloric acids thus appear to be effective preventives of, and most basic and specific remedies for, small-pox, with correlative maladies. Other preparations of chlorine, as chlorine water, chlorinated soda, chloride of iron and lime, chlorates of soda and potassa are likewise applicable, with doubtless also sometimes in the more sthenic stages, hydrobromic acid and the bromides of sodium and potassium, though the alkalies always with care from their liquefacient tendency; but better usually in the asthenic and colliquative conditions, sulphuric and phosphoric acids, with their corresponding salts

of iron, quinia, and strychnia, or lacto-phosphate of the same with lime.

Oil of turpentine, oxygen, peroxide of hydrogen, nitrous oxide, and other stimulants, hæmostatics, and corroborants are also indicated therein more or less freely according to special type, stage, and complications of the disease, its general tendency being of an adynamic character. In general, the vegetal acids, citric, tartaric, acetic, etc., or better in the form of lime, lemon, orange, tamarind, and other acid fruit juice, jelly, and drinks, or vinegar properly diluted and sweetened, with stewed acid fruit and more substantial food afforded in sour butter-milk and acid albuminoids are useful adjuncts to the acid mineral and other medicaments, and doubly beneficial as remedies and aliment in variola with like maladies.

The same remedies, regimen, and principles also apply in the treatment of the exanthemata generally, as scarlatina, measles, etc., with the other septic, contagious and scorbutic diseases, in which they are very efficient, as I can testify from long experience therewith in such affections, it being my invariable and basic practice therein from the successful results of their application. These mineral and vegetal acids, with acid food and fruit are also preventive as well as curative of such maladies.

In the treatment of that correlative and fatal disease—diphtheria, the mineral, animal, and vegetal acids, and especially the hydrochloric and nitro-hydrochloric acids, are also the basic and specific remedies, the local lesion and malignant affection of the throat being secondary and subordinate to the constitutional disorder which is dependent upon the ammoniacal, superalkaline, and toxic condition of the

blood, with atony of the general system, though the pharyngeal outbreak is the most immediately dangerous, and must receive due and simultaneous attention. So far as my experience goes, nitro-hydrochloric acid is the most potent and reliable specific remedy for diphtheria there is, and should I be obliged to depend upon any single agent alone, would prefer it to any other, but this is not necessary as it may readily be supplemented with other acids and remedies according to the special type, stage, intensity and complications of the case under treatment. Thus, ordinarily, I give the dilute nitro-hydrochloric acid in doses of from ten to fifteen drops in a goblet of lemonade, consisting of one lemon in that quantity of water sweetened to taste, which may be sucked through a glass or other non-corrosive tube *ad libitum*, so as speedily as possible to introduce enough acid to neutralize the superalkalinity and destroy the septic matter of the blood, disinfect the throat, alimentary canal, and body, and restore the normal equilibrium of hæmatosis, circulation, nutrition, secretion, and health. In its passage through the mouth, fauces, œsophagus, and stomach, or gastro-intestinal canal, it acts as a direct germicide, solvent, disinfectant, depurant, alterant, and resolvent, as well as antalkaline, refrigerant and tonic, locally and generally. In young children and adults without teeth, it may of course be taken directly, as it forms a very pleasant, attractive, and refreshing drink, though frequent small quantities are better than occasional large draughts, the frequency and quantity of the dose being proportioned to the age of the patient and intensity of the disease. This may often be sufficient of itself and especially with corresponding acidulous

regimen of fruits, juices, jellies, and other food, particularly sour butter-milk, specified elsewhere, to resolve the disease altogether.

In the more adynamic varieties of diphtheria and cognate diseases, I give in addition, a mixture of muriates of iron and quinia, with muriatic acid in lemonade or sweetened water, but when the disposition to faucial inflammation and exudation is strong, omit the quinine and add small quantities of potassium and sodium chlorate. Hence to supplement the nitromuriatic acid and better meet the special indications to counteract the plastic exudation in the throat, degeneration of the blood, and tendency to adynamia and paralysis, with the general septic condition, I usually combine in prescription, tincture of chloride of iron, hydrochloric acid, potassium or sodium chlorate, or both together in small doses, with, in cases of active disposition to, or much depression, tonic doses of muriate of quinia, all in orange, plain, or better still, tar-water—infus. picis liq. as a menstruum and mild stimulant, disinfectant, depurant, and alterative. Thus, for an adult, in the ratio of from ten to twenty drops of the dilute muriatic acid, ten to fifteen minims of the tinct. of iron, two grs. of the potassium and three of the sodium chlorate, one gr. of the muriate of quinia, and a tablespoonful to an ounce or more of tar water according to its tolerance, in one dose, all of which may be given in, or be followed with a draught of lemonade, sweetened barley, or plain water, as often as may be necessary. The acid and chloride of iron act locally and generally as antalkaline, antizymotic, astringent, disinfectant, antiseptic, hæmatic, and tonic agents. The potassium is a solvent of the plastic exudate and resolvent of the

inflammatory disposition, though it should be carefully given even in small doses, and subordinate to the acid treatment, as it will increase the superalkalinity, fluidity, and disorganization of the blood, and depress the action of the heart, circulation and system in general; hence, unless the exudative tendency is strong, it is better omitted altogether, and in all cases withdrawn so soon as the acute stage resolves, especially as it may be substituted by the milder sodium chlorate, which is likewise solvent, but not depressing, though apparently too diaphoretic sometimes, so also to be watched and diminished or withdrawn as the exudative disposition and inflammatory condition subsides. In fact, the sodium salt is often preferable from the beginning in this and other diseases, where a solvent and resolvent effect is desirable, though they may sometimes be combined with advantage.

This local inflammatory and exudative tendency in the pharyngeal region varies greatly, and according to its activity and non-complication with the constitutional dyscrasia or ammonæmia and septicæmia of diphtheria, it approximates true croup and ordinary cynanche, or more purely local inflammatory affections of the throat, which require the opposite alkaline treatment more exclusively, such as potassium and sodium chlorate, nitrate, citrate, etc., or when there is much irritation and spasmodic action alone or in conjunction therewith, better doubtless, the corresponding acid and salts of bromine, or hydrobromic acid, bromides of sodium and potassium, as they exert a special anæsthetic, relaxing, and resolving effect upon the fauces, yet, being in general, too depressing in diphtheria which requires a more exclusively supporting acid, antalkaline, and tonic treatment.

Iodoform is also too depressing in diphtheria and its asthenic correlatives, but will doubtless afford more direct and speedy relief in croup, especially its spasmodic form, with other sthenic anginose affections, as it is a prompt and potent local, pharyngeal, and general anæsthetic, antispasmodic, and resolvent, as well as germicide, antiseptic, and sorbefacient. It usually soon allays irritation, relaxes spasm, annuls pain, and produces sleep. It relieves urethral, utero-vaginal, intestinal, and œsophageal spasm and stricture, checks vomiting and cough, resolves swelling, promotes absorption, and diminishes excitability of the nervous and general system, acting both directly and indirectly in discussing oral, pharyngeal, bronchial, and pulmonary affections, and quieting the neuroses connected therewith. Hence, it is specially indicated in croup, mumps, hiccough, whooping-cough, with like affections, and those still more formidable maladies — hydrophobia, cerebro-spinal meningitis, epilepsy, eclampsia and tetanus, with sthenic irritability, supersensibility, spasm, sensori-motor, phlegmonous, neurotic and psychotic affections generally. The dose should be proportioned to the emergency, but, ordinarily I find that one grain every hour or two hours, more or less frequently, is usually soon sufficient to overcome quite active disorder, even one pill alone of gr. j of iodoform, and $1\frac{1}{4}$ grs. of iron (Warner's), will often allay severe pain and neuralgia, of the face and head especially, and induce sound sleep, though followed sometimes by temporary languor, but permanent relief. If taken too freely, it will produce chilliness, gastro-intestinal disorder, diarrhœa, and depression, with other evidences of intoxication therefrom.

Hydrarg, bichlorid, which has of late been so highly recommended as a disinfectant, germicide, and resolvent in diphtheria and correlative diseases, is also more applicable to the sthenic inflammatory stage and type than the more purely asthenic condition of such anginose affections, and may be used when necessary in conjunction with its compatibles, especially as a substitute for the alkalies when they are contraindicated, though I have never found it advisable to resort to it therein. In a discussion upon this subject at the late meeting of the Illinois State Med. Society, Dr. E. P. Cook, of Mendota, a former President of the Association, stated (*Jour. Amer. Med. Assoc.*), "that he had a limited experience in the use of bi-chloride of mercury. His experience of its use was that in follicular pharyngitis the patients all got well, but in malignant diphtheria they died. In the latter form of the disease, seven out of a group of eight of his patients had died after treatment with bi-chloride of mercury." Prof. Pepper and others commend its efficacy in diphtheria, but, at best it is a dangerous remedy, and apparently applicable more in the croupous than the malignant form of diphtheria, wherein, however, the alkalies are safer and usually promptly resolvent, though in smaller doses they may be commingled where their combined effects are desired.

Thus, diphtheria and croup with the more purely inflammatory forms of cynanche, differ widely in both their pathology and treatment, the former mainly requiring acids, the latter alkalies, though they often merge and blend with each other in every degree and variety, so as to need a mixed course of the neutral salts with acids or alkalies correspondingly, or the

more exclusive acid or alkaline treatment as the pathological conditions of the one disease predominate over the other, while the extremes are so distinct as to necessitate the free exhibition of either accordingly, the acid, antiseptic, and tonic treatment being basic and essential in diphtheria. Usually, in the acute stage of this disease, quinine is not so strongly indicated, and should not be given therein unless the adynamic disposition is active from the beginning. Besides, it is useful only in small and tonic doses of a grain or less, large doses being sedative and injurious in all cases. Hence, as the acute inflammatory stage diminishes I withdraw the alkalies, or withhold them altogether when they are contraindicated *ab initio*, and add the quinine to the iron and hydrochloric acid, with in addition thereto muriate of strychnia in doses proportioned to the age and necessity, as from the thirtieth up to hundredths of a gr., to more fully counteract the tendency to the paralysis which is so apt to ensue more or less suddenly as the active excitement declines in diphtheria. The solvent tar water serves the double purpose of an efficient adjunct and menstruum, as it is a mild stimulant, antiseptic, alterative, secernant, diuretic, and tonic, as well as local disinfectant, depurant, and alterant to the mouth, throat, and gastro-intestinal canal, though it is not very pleasant to take, and may be substituted by more agreeable, less active, aromatic infusions, as of eucalyptus, orange, water, or other convenient menstruum.

When a more decided diffusible stimulant is required, instead of alcoholic liquors, the effects of which are evanescent and obnoxious, I exhibit the oil of turpentine, as it is a more useful remedy, being an

active arterial and nervous stimulant, antizymotic, antiseptic, germicide, disinfectant, diuretic, diaphoretic, alterative, resolvent, depurant, and restorative, and, from its volatility may be administered freely and steadily by inhalation without drugging the stomach, thus acting favorably directly and continuously upon the pharynx and air-passages, blood, secretions, and general system of both the patient and attendants, the vapor of turpentine serving to disinfect the air and body, overcome the disease, support and restore the patient, and protect those exposed to the infection. "Turpentine being a germicide even in so weak a solution as one part to seventy-five thousandths," according to Dr. R. F. Weir, surgeon to the New York Hospital.—(*N. Y. Med. Jour.*)

Thymol is also an active volatile disinfectant and germicide, with the great advantages of having a pleasant odor and being non-irritant to the throat and air-passages. It may be exhibited singly or in conjunction with turpentine to disguise its offensive smell to many.

A still more potent nervous stimulant is phosphoric acid, which is also antalkaline, antipyretic, refreshing, and corroborant, but not so disinfectant and antiseptic as hydrochloric and nitromuriatic acids. It may be given as an adjunct thereto, or, in conjunction with its salts of iron, quinia, and strychnia, as phosphates or lacto-phosphates thereof, be alternated or substituted for the muriates of the same, especially in the latter stages and in convalescence, to counteract the scorbutic, superalkaline, and adynamic states of diphtheritic with cognate disorders—the paralytic particularly, re-invigorate the system, and restore the normal tonicity of health. Oxygen, peroxide of hydrogen,

and nitrous oxide are also applicable as potent disinfectants, antiseptics, hæmatics, revivifiers, depurants, stimulants, tonics, and restoratives, in this with correlative affections.

In diphtheria, with all the zymotic, septic, scorbutic, mephitic, infectious, and allied diseases, the free administration of the mineral acids should be supplemented by the liberal use of the vegetal and animal acids *ad saturandum*, either in solution as lemonade, or preferably when the stomach is intolerant of much fluid, in the concentrated juice of limes, lemons, oranges, grapes, and other acid fruit, with the jelly of cranberries, or other acidulous berries, and stewed apples, cherries, plums, prunes, and like edible sour vegetals, with as much sugar as desired, this being a valuable antiseptic, as well as corrigent, and and nutriment. Ripe, pulpy, juicy, acidulous fruit, as peaches, pears, plums, grapes, tamarinds, and the like, also afford both remedial food and medicine that may be taken more or less freely with advantage, laxative substances being in general, more essential in these diseases, though when otherwise, the *astringent* acid remedies, fruit, and food may readily be substituted.

For the more concentrated and purely nitrogenized aliment sour buttermilk, and cottage cheese when tolerated, with like acid albuminoids, with sugar, are most appropriate, agreeable, highly nourishing and restorative, the lactic acid therein acting as a digestive, antalkaline, antiscorbutic, antiseptic, antiphlogistic, febrifuge, and hæmatosic. It is a solvent of the membranous exudate, and depurant of the throat, stomach, and bowels, with the general system, thus acting beneficially both locally and constitutionally.

This acid fluid and solid food is in general, most acceptable and digestible, and preferable to extracts of beef or other meat, as such aliment is not ordinarily fancied or easily digested in this and cognate diseases, from lack of acid gastric juice. For the same reason, soused pig's feet, pickled tripe, acidulated oysters, eggs, caviare, and other albuminous food with vinegar or other acid, are most palatable and nourishing in such maladies, vinegar being also antalkaline, solvent, digestive, secernant, antiseptic, refrigerant, disinfectant, and depurant, useful both locally and generally, and may also be employed as a gargle and drink in these diseases. Peptonized food is also applicable when necessary, pepsin itself being an active solvent of the membranous exudate and may be exclusively employed therefor. Amylaceous aliment is usually undesirable and unnecessary, as it cannot readily be transformed, and its saccharine ultimate can be directly had sufficiently in both the cane and grape sugar with the acids and other food without taxing or clogging the stomach and bowels therewith. With these various articles the system can be supplied with an abundance of appropriate aliment, albuminous, saccharine, and acidulous, the most essential in such cases, in the most concentrated, easily digestible and assimilable form.

Thus, in fact, in diphtheria and correlative diseases generally the digestive and nutritive processes are more or less seriously impaired, and it is not only useless, but injurious to overload the stomach and system with food it cannot transform and appropriate, under the false idea of supporting, when it is really taxing and depressing the vital energies, and increasing the complications and danger of the disease.

Hence a judicious discrimination in the nature, quality, quantity, and condition of the food is all essential in this with all other diseases, as *alimentation is the basis of medication in all cases*, and the more exclusive acid aliment and remedies being most applicable in diphtheria and cognate maladies.

With this general acid and conjunct treatment no special local applications to the throat are required in diphtheria and its correlatives cynanche maligna, scarlatina, etc., though they may be employed to any extent indicated, particularly ice or cold externally as well as internally in the acute stage, as the acidulous remedies and regimen indicated act directly thereon and correct the gangrenous tendency, prevent the formation, and disintegrate, dissolve, and disinfect the fibro-plastic exudate, cleanse the pharynx, destroy the micrococci, fætor, and contagion, neutralize the superalkalinity, antisept and purify the blood and body, resolve the local and constitutional disorder, restore the balance of chemico-organic action, nutrition, secretion and defecation, invigorate the nervo-motor system, and re-establish the tonicity of health in general.

Moreover, in diphtheria, and all the zymotic, septic, scorbutic, and putrescible diseases generally, there is more or less intense instinctive craving for acids and acidulous substances, which clearly indicates their necessity and use. Usually patients take them eagerly and freely until the superalkalinity of the blood is neutralized, the scorbutic, septicæmic, inflammatory, and febrile condition allayed, the equilibrium of nutrition, secretion, and excretion restored, and the general system disinfected, depurated, and invigorated, the desire therefor proportionately diminishing

till it ceases altogether and they become repugnant, so that ordinarily this instinctive appetite for acids is a sure guide to their use, though from false ideas, perverted tastes, and acquired habits, it cannot always be relied upon, the pathological and physiological conditions being the best indications to the physician for their administration or withdrawal. Some of these are prominently presented in the appearance of the blood, mucous membrane, and general surface, especially in the lips, mouth, tongue, and countenance. These with the hands more particularly show a more or less diffused or mottled redness of a brownish, dusky, purplish or venous and scorbutic hue, varying somewhat according to the type and intensity of the disease, which disappears as the ammonæmia and superalkalinity is neutralized, and the lips, tongue, and complexion assume a clearer, lighter, and healthier color. This is usually so decided that the observing physician can surprise his patient by telling him he is loosing his relish for acids and that they begin to taste too sour and be repugnant, in marked contrast with their previous agreeability, so that they need not be taken so freely and be gradually withdrawn as the disease subsides and the corresponding necessity for them diminishes, being continued in a modified form in conjunction with the acid muriates, phosphates, or lacto-phosphates of iron, quinia, and strychnia, in the adynamic states of diphtheria and other diseases until the health is entirely restored. Chlorine vapor, chlorine water, and chlorinated soda, lime, sulphnr, carbolic, sulpho-carbolic and other acids, with their analogues and combinations are also useful in diphtheria with septic diseases generally, but are not so safe, pleasant, easily or freely taken as the acids and compounds thereof designated.

Thus, while microscopists find the same micrococci and fibro-plastic elements in the morbid condition and membranous exudate of the pharynx in diphtheria, croup, and other anginose affections, and see no essential difference between these local disorders of the throat, the physiological chemist and pathologist find in addition, the blood superalkaline or ammoniacal, deteriorated, and toxæmic, with an infectious principle, and a concomitant paralysis — mostly pharyngeal, though sometimes more general in the former, while the therapeutist putting all these together, logically deduces the specific treatment thereof in accord with the laws of chemistry, physiology, pathology, hygiene, and scientific medicine generally. This consists as indicated in the removal of all the active and remote causes thereof so far as possible, with the free use of acids—mineral, vegetal, and animal, especially the hydrochloric and nitric acids or nitro-hydrochloric, with chlorine and the chlorides particularly of iron, quinia, and strychnia, and sometimes the chlorates of potassium and sodium, as potent antalkalies, disinfectants, antizymotics, antiseptics, alteratives, resolvents and tonics, with the more exciting, nervous and general stimulants and hæmostatics, oil of turpentine, thymol, phosphoric acid, and phosphates or lacto-phosphates of iron, quinia, and strychnia, with oxygen, peroxide of hydrogen and nitrous oxide, to counteract the adynamic and paralytic tendency and invigorate the general system, the acids, their elements and analogues being the essential basic and specific remedies to neutralize the ammoniacal or superalkaline and toxæmic condition, destroy the microzymes, disinfect, and depurate the throat, blood, and body, and restore the normal

chemico-organic and dynamic balance of life, they being often of themselves sufficient, especially in the earlier stages of the disease to resolve it altogether, both in mankind and at least one, if not all the lower animals, as I had a favorite cat with the prominent symptoms of diphtheria that was promptly cured with sour milk I ordered her.

With this general plan of treatment with the acids —mineral, vegetal, and animal, as a basis, both in medicine and aliment, I have always found this dangerous disease—diphtheria, to resolve more or less speedily, and the patients soon recover their usual health without ordinarily any complications or prolonged convalescence. In fact, when seen in time, it may be thus aborted altogether, or rendered so mild as not to confine the patient to the house. In other malignant anginose affections and ulcerated sore throat, this acid treatment is also markedly efficient. Indeed, I believe that by proper sanitation and alimentation with the appropriate ingestion of acid juices, drinks, fruits, buttermilk, and other acidulated food as previously indicated, *cæteris paribus*, not only diphtheria, but all other zymotic, septic, infectious, necræmic, scorbutic, putrescent and cognate diseases, could be largely prevented, as well as more or less promptly cured by the additional more active medication with the stronger mineral acids and adjuvant resolvent, stimulant and tonic remedies. In fact, there is little doubt but what these diseases often occur in consequence of defective acid alimentation to neutralize the ammonia constantly evolved within the body in the normal chemico-organic processes, with that introduced from without the economy, and the frequent concomitant superalkalinity of the blood,

which is the basis and primary cause of these scorbutic, septic, zymotic, toxæmic, contagious and adynamic maladies. Hence the best preventive thereof is the avoidance as far as possible of all their superinducing causes, especially that most potent one tobacco in every form, with the due use of acid aliment, and remedies. Moreover, whenever or wherever diphtheria, or any of these correlative, zymotic, septic, and contagious diseases occur, every one exposed thereto should be put on this acid regimen, and closely watched so that if any symptoms thereof appear the mineral and stronger acids with cognate antalkaline and other appropriate measures may be immediately resorted to.

Confirmatory proof of the special value of acids in the treatment of diphtheria by the practical experience of physicians with the various forms thereof might be adduced, but I am not aware that they have ever been used as basic and specific remedies therefor in general by reason of their peculiar acid nature, much less upon the scientific principle of their efficacy as antalkalies, and particularly in neutralizing a common ætiological morbific alkaline factor of this, with all other zymotic, septic, contagious, mephitic, and allied diseases, with consequent abortion as well as direct extinction of their concomitant toxicoses and infection, and all of which are dependent upon an excess of that ever-present volatile organic alkali—Ammonia, constantly engendered so freely within the living organism itself, as well as introduced from without in various forms of malarial and other noxious ingesta.

Testimony is occasionally presented of the practical value of some one or another of the acids in the cure of diphtheria, and recently it is stated in the *Scientific*

American, by a California physician, Dr. Czartoryski, who lived long in the interior of China, that the Chinese freely take the fresh juice of limes with the fruit itself in diphtheria and consider it a specific therein as it hardly ever fails to effect a cure. In his own practice in Louisiana and California he has used limes and their juices with the greatest success even in the most desperate cases of diphtheria, wherein he orders "limes to be administered as freely as possible in any manner the patient can be prevailed to take them, especially in the form of hot lemonade, sweetened with white sugar or honey, or cut in slices with powdered white sugar." With lime juice, which he considers acts by affording an excess of oxygen to the blood, thereby preventing the development of vibriones, etc., he exhibits such drugs as may be indicated, with appropriate stimulants and nourishment to restore strength. Usually, however, cold lemonade, with acid water ice, or tart ice cream, ice, and iced drinks are most grateful and useful in the height of the disease, and hot acidulous drinks in the more asthenic conditions, although they may be given at any temperature according to the desire and morbid conditions of system. Lemon juice and other acidulous, with mucilaginous substances, as gum arabic, flax-seed, etc., have long been empirically popular in anginose affections.

Thus, experience proves that vegetal, animal, and mineral acids act specifically in resolving diphtheria with all other superalkaline, zymotic, septic, scorbutic, and allied maladies. But, while such experience is valuable, it is more purely empirical and blind, and it is only when duly correlated with other facts in ætiology, pathology, hygiene, and therapeutics, that

scientific principles and a true theory can be established that directs to the most accurate and successful treatment from positive knowledge of all the essential data upon the subject.

From the fact that this class of varied acid substances with cognate disinfectant, antalkaline, neutralizing, and resolving agents are so generally efficacious in scorbutic, zymotic, septic, infectious, putrescent, and correlative diseases, it supports the view of their common origin and dependency upon a superalkaline condition of the blood and system, of which the most general and active morbific element of the kind both from inherent and extraneous sources, is the volatile organic alkali—Ammonia, the existence of which in excess has been to a certain extent directly demonstrated in such maladies. Furthermore, from the correlative facts that this same organic alkali—ammonia, is being constantly engendered *de novo* from its elements within the body in the normal chemico-organic transformations, and that it may be abnormally increased by various causes as excessive heat, bodily exertion, molecular and morbid metamorphosis, with perverted disintegration and undue accumulation from insufficient elimination, as well as be more or less freely introduced from without in malaria and contaminated water from decomposition of organic matter, and more excessively with other alkaline and noxious substances in such pernicious agents as the juice, vapor, and smoke of tobacco, with the so frequent defective counteractive acid alimentation, and other aberrant influences, in addition to its potent volatile, permeating, solvent, irritant, and morbific power, it is not wonderful it should produce a general pathological state of the blood

and body, and induce those disorganizing scorbutic, toxæmic, necræmic, febrile, infectious, and mephitic conditions so often manifested in such a variety of constitutional and local dieases of a septic, contagious, and adynamic type, intensified and modified according to casual co-operative meteorological, pestilential and other agencies that so seriously afflict and destroy mankind with the lower forms of life the world over. Nor is it singular that the same general acid and correlative neutralizing, antalkaline, and antagonizing agents should act as basic and specific remedies in such a variety of diseases from an identical, underlying alkaline cause and dyscrasia, with or without the addition of special adjuncts appropriate to the peculiarities of each, according to their respective manifestations and complications. But, while there is thus such a close connection of these varied innocuous and malignant affections, both pathologically and clinically, there is a wide difference between a purely local lesion and a local manifestation or complication of a constitutional dyscrasia, though they are so often combined, and what commences as a benign local disorder may become from the additional superimposed ammoniacal and superalkaline condition of the system, a most malignant, infectious, and fatal malady, as is so frequently exemplified in the ordinary innocuous anginose affections becoming diphtheritic and contagious, as well as slight local lesions in different parts of the body becoming erysipelatous and malignant, with in like manner, all correlative maladies being intensified or assuming a virulent, contagious, and pestilential type.

Thus, the common naso-pharyngeal affections, both acute and chronic, may assume a diphtheritic and

infectious type from anything which surcharges the blood and system with an excess of ammonia, as well as the more direct toxic emanations from others that would otherwise in its absence be comparatively innocuous, it being but a matter of degrees between the most benign and the most malignant anginose, as with all other diseases. Diphtheria and contagia may be thus developed and communicated whenever this superalkalinity of system and concurring circumstances are favorable, which are doubtless more frequent than is generally suspected, as this ammoniacal condition of the blood and body may occur in every degree of intensity from the norme to a saturated morbific and pestiferous state.

In an interesting paper upon "Diphtheria Spread by Adults," read before the Medical Society of the County of New York (*N. Y. Med. Journal*), Dr. A. Jacobi presented facts to prove that there are a great number of cases of latent and chronic diphtheria in adults, which were regarded as but simple sore-throat, yet sufficiently contagious to disseminate the disease indefinitely among the people, by the patients being able to go about their usual business, and infecting many who came in contact with them, especially when they were in more or less immediate close relations therewith, as nurses, servants, and children, for as he forcibly observes, "*There is as much diphtheria out of bed as in bed; nearly as much out of doors as in doors.* Many a mild case is walking the streets for weeks without caring or thinking that some of his victims have been wept over before he was quite well himself."

Hence, it behooves every one to carefully cleanse, disinfect, and purify their mouths, throats, and air-passages, as well as blood and body generally, and

avoid exposure to infection, with particularly, the predisposing and exciting causes thereof from all noxious agencies that produce sore-throat or angina and ammonæmia or a superalkaline state of the system, the most common and potent of which are the baneful fumes and smoke of tobacco, so recklessly diffused everywhere, which not only excite naso-pharyngeal, bronchial, pulmonary, and other local disorders, but, furthermore create a pernicious constitutional dyscrasia that engenders toxic and infectious principles, with malignant types of disease, and intensify pre-existing abnormities—both local and general, thus often converting an innocuous affection into a virulent and contagious malady, as well as developing *de novo* pestiferous forms of disease that may be extended indefinitely.

Thus, the common pharyngeal affection in croup, quinsy, or ordinary sore-throat and cynanche generally, and so dangerous from its locality, though intrinsically benign within itself, is dependent more or less directly upon some local irritant or noxious vapor, and the same general meteorological cause of dampness and cold, or change of temperature, exposure, and other like causes, but while the local disorder may be similar, how different is the essential character, complications, danger, and treatment, of such abnormities when there is an existing ammonæmia, superalkaline or scorbutic condition of the blood, which renders both the local complaint and systemic derangement of a more or less virulent and infectious nature, as in diphtheria, cynanche maligna, and scarlatina, with erysipelas, and other local expressions or complications of a constitutional dyscrasia in different parts of the body, and which

require the same basic and specific acid or antalkaline treatment, so opposite and distinct from the former, to subvert and counteract the underlying superalkalinity and toxæmia, abort and destroy the contagia, and resolve the local lesion with the systemic malady.

This is remarkably exemplified in erysipelas, which may occur in any part of the economy from various traumatic and other agencies, or idiopathically, apparently from the intensity of the ammonæmia, concomitant blood poison, and systemic dyscrasia, without any immediate perceptible exciting cause, but, notwithstanding its multiple local manifestations, may be usually successfully treated upon the same general principles applicable to diphtheria and its congeners, with the mineral, animal, and vegetal acids, the muriatic or nitromuriatic especially, muriated tincture of iron, quinia, and tar water, with the acid regimen, and appropriate local applications, though sometimes the salts of potassium and sodium chlorate, may be conjoined in moderation, when it is of a more active phlegmonous and exudative character, yet are inadmissible in the more purely gangrenous variety in which the acid and tonic treatment is exclusively required. The sesquichloride or muriate of iron particularly, has obtained a well deserved repute in the cure of erysipelas, but it is probable that its efficiency is due more to its chlorine and acid than the iron, though the latter is doubtless also remedial therein, as erysipelas frequently occurs in plethoric persons whose blood is not apparently deficient in iron, but ammonæmic, toxæmic, corrupt, and loaded with noxious and excrementitious matters, which chlorine, acids, and other antalkalies, disinfectants, and antiseptics, neutralize, destroy and

eliminate. The milder acids alone are often sufficient to relieve and prevent this disease, as exemplified in the case of beer and spirit drinkers who are so subject thereto, and by whom the lactic, citric, and other acids in the form of sour buttermilk, sauer kraut, lemonade, and acidulous fruits and food generally are frequently empirically resorted to advantageously, to satisfy the instinctive craving for acid and antalkaline substances.

The same instinctive desire for acids is likewise manifested by tobacco consumers to neutralize the artificially induced superalkalinity of the blood and system, from the ingested ammonia, nicotia, and its other baneful ingredients, with also abnormal thirst for stumulants to overcome the depression from this noxious poison, hence the use of tobacco and spirituous liquors usually go together, acting and reacting with each other, both directly and indirectly to excite morbid appetites, with depraved conditions of body and mind, and debase, disease, and destroy mankind. In fact this craving for acids is thus so predominant in individual consumers of tobacco and alcoholic liquors, and is so general, as to become a sort of national peculiarity in people addicted or exposed thereto, as indicated in the following remarks on "Tobacco and Pickles," in the *Druggist's Circular:*

"The Dutchman of to-day is as great a smoker as was his great-great-grandfather. The pipe has, however, given way to the cigar; and the meanest laborer indulges himself, often when at work, with the 'weed,' which costs him less than a farthing. . . . . The teeth of a Dutchman is nearly as characteristic as the skin of an Englishman who has lived for a long time in India; they are much discolored, and many of

the incisors are carious. The Odontological Society will find the best specimens of discolored teeth from smoking among modern Dutchmen. The Dutchman's partially for pickles is peculiar, yet easily explained. In Rotterdam, but more largely in Amsterdam, pickle-stalls are not much less frequent than apple-stalls in London. The pickle-stalls seems to be, with many workmen, the half-way house between the work-shop and the dining-room. This nation of confirmed smokers abounds in dyspeptics; and the poorer classes give their clammed palates a filip occasionally with the sour and acid substances sold in the streets."

Gastric troubles, however, are not the only local disorders from tobacco, as it also, as before stated, causes diseases of the mouth, throat, nares, air-passages, lungs, heart, liver, kidneys, and other important organs, with the general state of superalkalinity, toxæmia, and adynamia, for the relief of which the instinctive craving for acids and stimulants or tonics indicate the basic and predominant means of cure, similar in general to that required in erysipelas and allied dangerous manifestations of a like constitutional dyscrasia, with of course the removal of the cause as well as treatment of the effects.

Moreover, in a similar internal local expression of a general dyscrasia from ammonæmia and its concomitants, which is engendered more particularly by the prolonged physiological function of gestation, as well as excited by parturition, although the former is usually the remote cause of the superalkalinity and toxæmia and the latter the immediate excitor of metro-peritonitis and septicæmia or puerperal fever, the same basic and specific acid and collateral treatment is best adapted, and will promptly relieve according to my experience. Thus, for example, in the

case of a primipara, from whom, after ineffectual efforts to deliver herself even with the aid of ergot, I had to remove the child with the forceps while she was under the influence of ether, and resuscitate it after much effort, I found on attempting to extract the placenta that it was retained, and on examination discovered an hour-glass contraction of uterus, which I overcame by gentle and steady pressure with my folded fingers, enough to reach and carefully remove the secundines from the fundus. Metro-peritonitis, scanty lochia, with an ominous cadaverous odor, general sinking, and febrile symptoms, with other evidences of septicæmia and puerperal fever soon ensued, but by the acid treatment as a basis, of nitro and hydrochloric acids, sesquichloride of iron, potassium and sodium chlorate, and quinia in tar water, with active stimulation by the oil of turpentine alone, locally and generally, without alcoholic liquors of any kind, and appropriate aliment, she so speedily and perfectly recovered, that in less than two weeks, contrary to my most earnest advice, she took her babe and went out to the Centennial, several miles distant, it being the last day of the Exhibition, determined to be able to say that she and her child had been there, which visit, though necessarily attended with considerable risk and fatigue, fortunately did not result in any mishap.

As spirituous liquors promote the development of such ammoniacal, toxæmic, erysipelatous, and phlegmonous conditions manifested in puerperal metritis, septicæmia, fever, and allied affections—local and general, they are contraindicated therein, while the acids and their cognate elements and salines, with the oil of turpentine, quinia, and other antalkalies, disinfectants, resolvents, stimulants, and tonics, according

to the special type, stage, complication, and depression, are most applicable and useful to neutralize the superalkalinity, destroy, nullify, and eliminate the poisons, discuss the disease, and restore the vigor of health.

Alcohol promotes the inception of, and is opposed to resolution and recovery in puerperal fever with all allied affections, as it deoxidizes and asphyxiates every blood-corpuscle, molecule, and part of the system, and induces a state of toxæmia both directly and indirectly, with a scorbutic, septicæmic, and erysipelatous cachexia, hence is doubly injurious therein. Much evidence might be presented in proof thereof. Thus, for instance, in an interesting article on the "Toxic Effect of Alcohol in Exsanguinity," (*Jour. Amer. Med. Assoc.*, March 8, 1884,) Dr. Joseph Sager pertinently observes in this connection:

"Alcoholic toxæmia will produce a constitutional tendency to inflammation. This we notice in debauchees. While in this debauched condition from alcohol, the least lesion tends to inflammation. The worst case of cellulitis I have had, was a case of this kind."

"In my early practice I remember a physician who invariably 'dosed' his puerperal patients with whisky. This physician had more puerperal fevers to contend with than any other physician in his vicinity. He finally sacrificed his own wife to this sinful practice."

"I know of a bleeder, who whenever she would take wine, the hæmorrhage was increased. She finally refused to take it at all. I gave her credit for her good sense."

Alcohol not only promotes ammonæmia, congestion, hæmorrhage, and inflammation, but also lithæmia, sep-

ticæmia, pyæmia, uræmia, anasarcous, albuminuric, and correlative abnormities with their destructive concomitants—both systemic and local, in fact, it variously enervates and disorders body and mind, hence it is especially pernicious and objectionable in the pregnant and puerperal state with all cognate conditions tending to a superalkaline and toxic, as well as in a pre-existing morbid and malignant state of system.

Conversely, the acid regimen is adverse to such abnormities, and is very appropriate during the whole period of gestation as a rule, to prevent ammonæmia, uræmia, and their concomitants, with the terrible puerperal eclampsia as well as fever so apt to ensue from pregnancy and parturition, though it is probable they depend to some extent upon urate of ammonia and concomitant toxic agents, rather than the more simple uræmia, as urea is an active diuretic and hence not easily retained in the body without renal obstruction, while both ammonia and uric acid are more freely formed and kept therein from defective oxidation and elimination in such conditions of the system. But, as the acids promote oxidation, diminish the production, increase the final evolution and expulsion of such excreta, they are strongly indicated in the gestative and parturient periods as well as in general, to subvert such dangerous tendencies and sequelæ. Hence, a judicious use of lemon, lime, and other acid juices, jellies, fruits, and the more nutritious articles of the acid regimen, sour buttermilk especially, as fancied and required, will directly counteract the basic causes of sickness of the stomach, and other disorders of pregnancy, with puerperal eclampsia and fever, as they subvert the ammoniacal

dyscrasia, neutralize the superalkalinity of, and depurate the blood and body, promote the normal secretion and action of the stomach, liver, bowels and kidneys, with nutrition and the healthy functions of life generally, refresh and invigorate the system, and proportionably favor gestation and parturition, with the general physiological processes of restitution.

As thus indicated, the excessive production and accumulation of ammonia, uric acid, and their congeners in the body is both a cause and consequence of defective oxygenation, nutrition, albuminuria, and disordered action of the kidneys, with Bright's disease, as well as numerous other local and general abnormities, especially when other emunctories, as the lungs and skin are unable to excrete them sufficiently. "Ammonia has long been recognized as an exhalation from the human body in health, from the skin as well as the lungs. . . . . Reuling has shown that the quantity of ammonia in the expired air is increased in certain diseases, particularly in uræmia. Its characters in the expired air are frequently so marked that patients who are entirely unacquainted with the pathology of uræmia sometimes recognize the ammoniacal odor in their own breath." (*Flint's Physiology.*) Thus not only by the superabundance, but active excretion of ammonia and its congeners through the kidneys, lungs, and skin, renal, pulmonary and cutaneous, with other diseases are originated. Besides congestion of, and hæmorrhage from, with other diseases of the kidneys, lungs, and skin, they are thus doubtless more or less active in the production of that intractable variety of eczematous disease which require and often yield to the basic acid and antalkaline treatment, especially with iron and other constructive and restorative agents.

Furthermore, in the minor though often severe and dangerous local affections of anthrax or charbon, malignant pustule, and carbunculoid affections, with gangrenous and sloughing wounds and ulcers, purulent, scorbutic, and mephitic manifestations generally, likewise so largely dependent upon ammonæmia and concomitant toxæmia, the mineral, animal, and vegetal acids are of supreme importance as basic and constitutional remedies as well as general resolvents of the local disorder. These local affections with the more general systemic maladies being often a result of defective alimentation and sanitation, from insufficient acid diet, impure air and malaria, tobacco, alcohol, bad hygiene, overcrowding, overwork, and undue heat, as well as injuries, or traumatic, toxic, and other causes, the immediate ill effects of which in causing this ammonæmia or superalkalinity of the blood with toxæmia, necræmia, septicæmia, and often sudden death, is seen in close confinement in hot places particularly, and from sun and heat stroke, as well as in ill-fed, overexerted and over-driven men and cattle which frequently die so suddenly and decompose so rapidly. A notable instance of the rapid spontaneous development of this ammonæmia, putrid crasis, septicæmia, and contagious fever is presented in the case of the survivors of the notorious Black Hole, of Calcutta, who were immediately seized with a malignant typhus fever from their short imprisonment and inhalation of poisonous exhalations from their companions in misery, with the noxious matter engendered in their own bodies.

The same general pathological condition of the blood from the excessive evolution of ammonia in the body as well as introduction therein from without,

and special local tendency to the liver with other organs, is largely induced by excessive heat, especially in hot weather, seasons, and climates, with the consequent production of hepatic and other disorders as inflammation and abscess of the liver, and such fevers as bilious, remittent, congestive, as well as the more profound typhus and ship, and doubtless also that formidable one of tropical climes—yellow fever, as it has been shown that in common with the others, it is largely dependent upon an ammoniacal and superalkaline condition of the blood, ammonia being the most probable alkaline morbific agent therein, as it is so freely spontaneously engendered by heat and organic transformation, or decomposition within as well as without the living organism, though the same general superalkaline, scorbutic, and toxic condition may also be engendered in cold climates, and in fact, at any time, anywhere. Heat alone, but with moisture, so commonly combined in warm climates and places, being still more active in the production of such maladies as bilious, ship, typhus, congestive, yellow, and other malignant fevers, with the other pestilential diseases and plagues that so often and largely destroy both human beings and the inferior animals in hot seasons and climes. Thus the heat excessively increasing the development of ammonia in the vital economy, while the moisture in the air prevents its escape with other effete matter from the system, besides its free production outside the body in the decomposition of organic substances and introduction therein from the same causes, thereby doubly charging the blood and body with an excess of ammonia and other noxious matter, and inducing a superalkaline, toxæmic, and febrile state thereof with

often local inflammatory and gangrenous lesions. Ammonia concentrated or in excess, being irritant and corrosive, and having a special tendency to excite inflammatory, febrile, and disorganizing conditions of the blood, tissues, organs, and system in general, which is intensified by external heat, malaria, defective alimentation and sanitation, bad habits and modes of living, tobacco miasm, alcoholic liquors, and other noxious agencies, is thus a potent cause of the most malignant zymotic, septic, necræmic, infectious and putrescent maladies, as well as the less virulent scorbutic, mephitic, phlegmonous and gangrenous diseases. In a minor degree, this ammoniacal and toxic condition of blood and system is manifested in, and experienced by, every one, in the oppression, languor, prostration, and feverish feeling in close, warm, moist weather, for the relief of which the milder acids and acid regimen is so efficient, but in the more intense febrile states as common, bilious, remittent, typhus, ship, and other fevers, the stronger mineral acids are required, and as the acid treatment is so effective in these it will doubtless also prove as efficacious in yellow fever.

The value of acid medication in this formidable disease has recently been shown by the successful use of phenic and sulphurous acid in yellow fever, as it is stated in the *Med. and Surg. Reporter*, that Dr. De Lacaille, of Rio Janeiro, "professes to have cured thirty-eight consecutive cases of yellow fever by the use of Declat's preparation of phenic acid, sulphophenic acids, and in grave cases the phenate of ammonium. In the early stages the hyperdermic method is necessary. He contrasts very favorably his recent experience with his former sad failures without these drugs."

But as the body is already charged with ammonia in yellow fever, the greatest success would doubtless result in the treatment thereof as in allied diseases, by omitting it and its compounds, and exhibiting the mineral, animal, and vegetal acids more exclusively, with corresponding regimen as elsewhere indicated, with ol. terebinth. and like disinfectant, febrifuge, alterative, stimulant, and corroborant measures, according to the special indications in the varied states and complications of the disease.

Besides the strong mineral acids with the vegetal acid fruit juices, some of which as lime and lemon juice are sometimes difficult to get in the colder climates, and more secluded places in times of emergency, there is the concentrated citric, acetic, lactic, tartaric, and other vegetal acids in various forms and solutions, more or less specifically useful in all such heated scorbutic, febrile, septic, infectious, putrescent, and mephitic conditions of system, from the most benign to the most malignant, prominent among which is the common compound of acetic acid in the form of vinegar.

Vinegar is an active antalkaline, digestive, refrigerant, febrifuge, styptic, antizymotic, resolvent, disinfectant, depurant, secernant, diaphoretic, and diuretic. As a condiment with food it is in common use advantageously, and in water duly sweetened, it forms a very agreeable, refreshing, cooling drink, and has long been so used as a beverage in heated states of the system as well as in disease, and will doubtless prove as valuable in yellow fever as in all other diseases of the same general character, both internally and applied to the surface. "It displays decided soothing and refreshing properties, and is employed

with advantage in *inflammatory* and *bilious fevers*, quenching the thirst, calming the vascular excitement, re-establishing the perspiratory function of the skin, and restoring the action of the kidneys. . . . It proves a direct antidote *in poisoning by the alkalies.* In these cases it is a safe and efficient remedy."—(*Waring's Practical Therapeutics*).

From its usefulness in putrescent and infectious diseases, vinegar disguised or aromatized, has been covertly applied by robbers to protect themselves in epidemics while pursuing their nefarious business, as in the plagues of Southern Europe and the East, hence has gained an empirical celebrity and designation as "Thieves' Vinegar," and, though greatly overrated as a protective agent by ordinary inhalation in such cases, yet when freely vaporized and inhaled, or directly applied to the throat and surface of the body, is quite useful in gangrenous affections of the nose, mouth, pharynx, air-passages, lungs, and septic conditions of system, as in diphtheria, cynanche, scarlatina, putrescent fevers and affections generally. Taken internally, properly diluted and sweetened, it is of much practical value as an antalkaline, antipyretic, antiseptic, disinfectant, and restorative, though as Dr. A. T. Thompson observes, "In its undiluted state, it is a powerful stimulant," (irritant?) "and when daily taken in large doses, in its diluted form, it produces great uneasiness, cramps, and colics, and gradually destroys so effectually the texture of the stomach, and its digestive functions, as to cause emaciation of the body."—(*Ibid.*)

The undue use of vinegar will even cause consumption, but in malignant fevers with infectious, putrescent and scorbutic diseases generally, its free use

internally and externally, until these are overcome, will be corrective and beneficial, although it should not be employed to the exclusion of the more potent acid and other remedies therefor, but rather in their absence or in conjunction therewith. The old and well-known mixture of vinegar, molasses, and water, forms a very refreshing antalkaline, antiseptic, and antipyretic drink, useful not only in ordinary heated conditions of system, but also in the malignant fevers, and allied affections, and may often be resorted to with advantage when the finer and stronger acids are not at hand.

The acid treatment with the mineral and vegetal acids, especially the hydrochloric, nitro-hydrochloric, phosphoric and citric, with the other mineral and vegetal acids, and acid vegetal, and animal regimen previously indicated, is also applicable and will no doubt prove as basic and specific in the prophylaxis and treatment of yellow fever as in the correlative maladies of ship, typhus, remittent, and other malignant fevers, with small-pox, scarlatina, diphtheria, and other zymotic, septic, contagious, mephitic, and adynamic diseases. Fortunately in general, these mineral and vegetal acids can be readily obtained, though when some of the latter are not to be had in the fresh state as lime and lemon juice, etc., in times of emergency on ships at sea, and elsewhere, they may be substituted by their basic Citric acid, and as this is so efficient in the prevention and cure of scurvy, scorbutic, and septic diseases in general, it will doubtless prove as specifically useful in yellow fever.

"*Lemon juice owes its efficacy to Citric Acid.* . . . Dr. Bence Jones finds that an ounce of Lemon juice contains from twenty-seven to twenty-eight grains of

anhydrous Citric acid, and about three-quarters of a grain of Potash, equivalent to two grains of Citrate of Potash." His experiments with the juice "show that its action on the animal system is in all respects identical with that of free Citric acid and entirely distinct from that of a neutral Potash salt. 'For all practical purposes,' concludes Dr. B. Jones, 'we may regard Lemon juice as a free solution of Citric acid.' Lemon juice from which the free acid has been removed by Lime, is of no use in Scurvy at all."

"*Citric acid, given alone, is an admirable Antiscorbutic.* Dr. Trotter long ago stated that he had experienced the power of this acid to be equal to any effect he had ever observed from the recent fruit in its most perfect state. And of the juice of the fruit he records that it was found 'a most infallible remedy,' both in the prevention and cure of Scurvy. The advantage attending the use of this acid in sea voyages is recorded by Sir Gilbert Blane and Dr. Bryson. Dr. McWilliam, who has had a large experience of its use assured me that he had found the simple Citric acid an admirable remedy in Sea-scurvy. Dr. Ritchie gives sometimes Citric acid, sometimes Lemon juice, and finds them equally serviceable. . . . So that the positive experience of these and other physicians is in direct confirmation of the probability already established, that Lemon juice owes its remedial efficacy to this acid."—Headland, (*Action of Medicines.*)

In fact the experience of physicians everywhere is to the effect that Lemon juice and Citric acid are specifics for scurvy and scorbutic affections generally, and that the latter is the active principle of the former, though sharper, and perhaps not quite so

pleasant and lenitive, hence the juice with the mucilage of the pulp of the fruit is usually most acceptable and will admit of freer use, as well as supply a larger modicum of nutriment especially grateful and useful when combined with sugar.

Citric Acid is antalkaline, antiscorbutic, antiseptic, germicidic, antperiodic, refrigerant, febrifuge, diaphoretic, diuretic, secernant, digestive, depurant, laxative, and restorative, though in large doses sedative and depressing. Property diluted and sweetened, "Citric acid constitutes a most serviceable and agreeable beverage *in fevers, and in those of a typhoid character.* This is rendered more grateful and refreshing by using water impregnated with carbonic acid gas. In the ordinary condition of the stomach, Citric Acid, either pure or combined, does not weaken the stomach; and in some irritable states of that organ, characterized by a sensation of heat, painful digestion, an unpleasant taste in the mouth, and a disgust for food, it removes these symptoms, and proves decidedly beneficial; but, on the other hand, when the stomach is highly irritable, and its nervous susceptibility great, Lemon juice or Citric Acid, even when largely diluted, cause heat, uneasiness, pain, and not unfrequently obstinate vomiting. Nevertheless as Mr. Broussais has remarked, the Citric is that acid which the stomach supports the best when suffering from inflammation."—(*Waring's Pract. Therapeutics.*)

Some of this gastric disorder and intolerance, is caused by the large quantity of fluid with the Citric acid, and its uncombined state, which may be avoided by giving it in sweetened gum arabic or barley water, and by letting the patient suck or sip the juice of limes, lemons, or oranges with as much sugar as they

desire, or they may be incorporated together as a confection and taken at pleasure. Citric acid or lemon juice is especially useful in inflammations, fevers, scorbutic, septic, infectious, dyspeptic, hepatic, costive, anuric, and dropsical affections. It is particularly active in quenching thirst, reducing heat, and arterial excitement. "Dr. Owen Rees found that Lemon juice in doses of ℥j thrice daily, caused a great depression of the heart's action, in one case it fell from 120 to 75; in another from 110 to 74; the pulse at the same time being rendered smaller. These effects were observed in patients suffering from acute Rheumatism, but the same effect was observed in the healthy body; thus, a clinical clerk took f℥j of Lemon juice thrice daily for three days, and carefully noted his pulse, which was naturally full, and about 75 in the minute. After five doses the pulse became much weaker, was more compressible, and numbered 70 in the minute. On the third day the pulse became as low as 66, and was very small and compressible. The urine was always acid, and also natural in quantity, till the third day, when it increased somewhat; the Sp. Gr. was then 1.017, and there was a deficiency of Lithic Acid. *As an antidote to acro-narcotic poisons*, Lime or Lemon juice is often very effectual. Its *modus operandi* is obscure, but its effects are often very remarkable. In overdoses of Croton seeds (Croton Tiglium), I have witnessed almost immediate cessation of the vomiting, purging, and pain, from a single draught of lime juice."—(*Ibid.*)

In the sickness of stomach, superalkalinity of blood, toxæmia, biliousness, thirst, constipation, and other disorders from that potent acro-narcotic poison—tobacco, Lemon juice or lemonade with other acids

also afford relief, doubtless by neutralizing the inhaled alkalies and promoting secretion with the elimination of the poison from the body. This was practically discovered by the gentleman mentioned as so susceptible to the noxious effects of tobacco, who finds that lemonade and the acid regimen afford more direct relief than anything else, though anodynes are required to relieve the concomitant neuralgia therefrom, with general abstemiousness from much food until the stomach and system recover their normal tone. Citric acid and lemon juice are also useful in sickness of stomach from pregnancy, and in nausea and vomiting from other causes, especially when dependent upon ammonæmia with its concomitant toxæmia, and malarial or scorbutic conditions of system, hence is strongly indicated in yellow fever, both to prevent and correct the emesis so frequent therein, as well as for its general antalkaline, febrifuge, antiseptic, resolvent, secernant, diaphoretic, diuretic, depurant, restorative, and other remedial effects required in this pernicious disease with others of a like character. Thus in all sthenic fevers, the juice of limes and lemons, or citric acid in the form of lemonade, concentrated and cold or *iced*, may be given as freely as the stomach will bear, while in the asthenic form, nonfebrile, scorbutic and adynamic states, *hot* lemonade is often preferable, with other adjuvant acid remedial agents as indicated.

Lemon juice or its analogues may often be advantageously combined with coffee or other corroborant, whenever a refrigerant stimulant tonic is required. Lemon juice in coffee is very efficient as an antiperiodic, antalkaline, alterative, and restorative in chronic paludal affections especially, as well as the

more acute malarial disorders, the latter itself being also a potent antiperiodic, and tonic. I have found this combination very effective in breaking up chronic intermittents, exhibited in the strength of the juice of a medium-sized lemon to a cup-full of strong coffee sweetened to taste, as often as required. This will sometimes succeed when quinia and the usual antiperiodics and tonics have failed, though it may be employed in conjunction therewith, according to the special indications. It is especially applicable as a preventive as well as cure of malarial diseases.

In a paper read at the last International Medical Congress, in Copenhagan, Prof. Conrad Tommasi Crudelli, of Rome, thus testified to the value of lemon juice in malarial diseases (*Medical Record*): "It is well known that in Italy, Greece, and North Africa, that they often use lemon juice or a decoction of lemon seeds, as a remedy in malarial fevers of moderate intensity; and in Gaudaloupe they use for the same purpose a decoction of the bark of the roots of the lemon tree. All these popular practices tend to show that the lemon tree produces a febrifuge substance, which resides in all parts of the plant, but which would seem to be most abundant in the fruit. In fact, among the popular remedies employed against malarial infection, that which I have just described is the most efficacious for it can be employed with good effects in acute fevers. But it is especially advantageous in combating the chronic infection, which is so rebellious to the action of quinine, and in removing or moderating its deplorable effects."

Moreover, according to Dr. Schulz, France, (*Boston Jour. of Chemistry*), Citric acid is a potent antiseptic

and germicide. He "found that one drop of a solution of one part of acid to one thousand of water placed in a liquid containing bacteria and other organisms instantly caused their death as observed under the microscope." Besides, he "found a five per cent. solution of the acid to prevent meat from decomposing."

Tartaric Acid, with which citric acid is sometimes adulterated, is also useful to a limited extent as an antalkaline, febrifuge, laxative, etc., and may be used in small doses for the same purpose, largely diluted in water sweetened to taste, as a cooling, refreshing, resolvent drink in yellow, as in other febrile, inflammatory, heated, septic, and scorbutic states of system. But it should always be exhibited with care, and rather in the absence of better remedies, for "although cheaper and consequently more used than Citric Acid, it is inferior to it in many respects, being more apt to disorder the digestive organs, to produce colic, and to purge. In large doses it acts as an irritant poison. One ounce dissolved in half a pint of water caused violent inflammation of the alimentary canal and death in nine days. When its employment in medicinal doses, is followed by a red and dry tongue, it ought to be discontinued—(Dr. Thompson). It is said to be the best artificial solvent of mucus, and may be advantageously given when this exists largely in the bowels."—(*Waring's Pract. Thera.*)

Lactic Acid, is also another organic acid, of both animal and vegetal origin. It is especially useful as antalkaline, digestive, antiseptic, antizymotic, febrifuge, resolvent, depurant, and restorative, applicable in the prevention and treatment of diphtheria, typhoid, yellow and other fevers, with cognate zymotic, septic,

contagious, scorbutic, and mephitic diseases. In fact, as it is constantly engendered in the system, it may be partly from its deficiency at times that ammonæmia or superalkalinity of the blood with lithæmia, toxæmia, and their febrile and other morbid concomitants often ensue, though when in excess, it may excite inflammatory or other disease, as rheumatism, cardiac, and arthritic disorders for instance.

In this connection Dr. Headland says (*Action of Medicines*): "It has long been considered probable, but may now be said to have been proven by the researches of M. Becquerel, that in febrile disorders and in inflammations there is excreted in the urine an excess of Urea and Urate of Ammonia, substances which are formed by the oxidation of the Nitrogenous tissues. This extra-oxidation probably arises from a deficiency of that matter which is the proper food of oxygen in the system. This, as we have seen, being the step between grape sugar and Carbonic acid, must either be Lactic acid, or something similar to it. It must be remembered that no food is usually taken in fever; this would at length quite cut off the usual source of this Lactic acid, which is the starch and sugar of the food, and render it necessary that the animal tissues should continue to undergo oxidation to maintain the animal heat. Rheumatism and Gout are an exception to this."

Hence, to correct this deficiency of acid and aliment, neutralize superalkalinity of blood, allay fever, restore the equilibrium of chemico-organic action, calefaction, and nutrition, Lactic acid should be given in solution with sugar, or better still, in its natural connection with nitrogenized aliment, as in sour

buttermilk, sweetened to taste. This supplies appropriate medicine, refrigerant and refreshing drink, with the most essential food in an acceptable form to the palate and stomach at the same time, an important advantage—indeed, often vital necessity in yellow, ship, typhus, puerperal, and other low fevers and correlative diseases, in which the more substantial animal aliment in the usual forms is frequently repugnant and the stomach so intolerant of everything.

In the absence of better remedies the juice of sauer kraut, sour cider, and sour wine, might be resorted to as acid remedies in zymotic, septic, contagious, scorbutic, putrescent and allied diseases, though in general, spirituous liquors of all kinds are objectionable in such maladies, as alcohol parches the mouth and throat, irritates the stomach and liver, diminishes the secretion of the gastro-intestinal canal and general system, dries the skin, increases thirst, prevents oxygenation, arterialization, hæmatosis and normal chemico-organic metamorphosis, pollutes and induces a toxic and scorbutic condition of the blood, and promotes congestion, inflammation, and hœmorrhage, particularly of the stomach and liver, with special tendency to emesis and those forms of disorder expressed in the general term of "*mal des ardens*," which are usually so predominant in typhus, yellow, ship, bilious, puerperal, and other fevers, with erysipelas, diphtheria, infectious, and septic diseases generally. In fact, alcoholics everywhere the world over, especially in hot weather and tropical climes, are subject to abnormal thirst, dyspepsia, congestions, inflammations, and defluxions of stomach, liver, lungs, brain, and kidneys, with gastric, bilious, blood, nervous, and epidemic maladies, that disable and destroy them

largely. Hence alcoholic liquors are contraindicated in typhus, ship, yellow, bilious, puerperal, and all other fevers, with small-pox, erysipelas, diphtheria, septic and scorbutic diseases generally. They are unnecessary even in small quantities for stimulant purposes, which at best is but temporary and soon followed by reactive depression, or sedation, as phosphoric acid and ol. terebinth., with other agents, are superior, and far more appropriate not only as stimulants, but also for other essential uses in such cases, their action being more direct, physiological, radical, permanent, and remedial, in marked contrast with the noxious, morbific, and baneful effects of alcohol both immediate and remote, unless used with the utmost circumspection in *small* quantities, there being no greater fallacy than its free use as a stimulant and food, when it really enervates, relaxes, narcotizes and starves the system, and acts as a pernicious poison, both directly and indirectly.

Alcohol neither supplies nutriment, heat, nor force to the vital economy, but robs it of all, and is in no sense an aliment, but a noxious drug, that coagulates, hardens, toughens, and renders food less digestible; diminishes, precipitates, and prevents the transforming action of the digestive ferments; arrests the chemical processes of digestion, oxidation, and arterialization; counteracts sanguification, assimilation, and nutrition; and subverts both formative and retrogressive chemico-organic metamorphosis; as well as deadens, disorders, and destroys the higher dynamical functions of nervous, mental, and moral life, of which the common phenomena of intoxication, and the myriads of poisoned, diseased, degraded, and dying human beings therefrom are ample evidence

presented everywhere throughout the world, alcoholism being a prevalent endemic in all times and climes, whenever or wherever this potent alcoholic poison under whatever guise, is ingested. Therefore, as alcohol does not render food more, but less digestible; does not quench, but produces thirst; does not enhance, but nullifies the activity of the digestive ferments; does not nourish, but starves the body; does not increase, but diminishes oxygenation and calorification; does not promote, but prevents sanguification; does not purify, but corrupts the blood; does not facilitate, but subverts normal chemico-organic metamorphosis and depuration; does not augment, but lessens vital energy; does not invigorate, but enervates the system; does not support, but destroys health; does not prevent, but induces disease; does not refine, but debases the physical, mental, and moral nature; does not diminish, but increases vice, crime, and licentiousness, with concomitant evils; does not promote, but subverts healthy procreation, and hereditarily entails deformity, dementia, depravity, and debasement of body, mind, and morals upon progeny; does not ennoble, but brutalizes mankind; does not lengthen, but shortens life; it has no quality or application whatever as a food and beverage, and but a limited use as a drug. Though the principal medicinal value of alcohol is as a stimulant, yet it is but an evanescent excitant in small quantities, and a powerful intoxicant, narcotic, and relaxant, or stupefacient and depressant of body and mind, in large or frequent small doses, its secondary and reactive depressing with its other deteriorating effects so predominate, as to render it inapplicable for prolonged stimulant with collateral restorative

purposes. In fact, in many respects, independent of its obnoxious properties, it is inferior as a remedial agent to other drugs, especially the oil of turpentine, to which we will now invite attention as an efficient substitute therefor, in its connection more particularly with malignant fevers and correlative diseases, and disorganizing and depressed conditions generally.

Oleum Terebinthinæ. The oil of turpentine is a powerful stimulant, disinfectant, germicide, antizymotic, antiseptic, alterative, hæmostatic, depurant, secernant, diaphoretic, diuretic, purgative, and anthelmintic, and externally a rubefacient and vesicant. It stimulates the heart and circulation, brain, nervous, and general system, disinfects and depurates the blood and body, obviates the tendency to, and checks hæmorrhage and putrefaction, promotes normal secretion of the air-passages, mouth, gastro-intestinal canal, skin, and kidneys, destroys microzymes, intestinal and other parasites, and acts as a general alterative, resolvent, stimulant, and corroborant. It has, moreover, the superior attribute of being so volatile that it can readily be introduced into the blood and body *ad saturandum*, by involuntary inhalation without dosing the stomach, which is especially important in diseases of the throat, air-passages, lungs, heart, and blood, ship, typhus, bilious, puerperal, and other low fevers, cholera, collapse, and depressed conditions of the system in general, though sometimes its local action on the stomach and bowels is desirable therein, as in the hæmorrhagic and ulcerative states of yellow and enteric fever, serous, choleraic, and other asthenic gastro-intestinal affections. It is also readily absorbed through the skin and rectum, rapidly enters the circulation and appears in the urine

and breath, so that its volatility, penetrability, diffusibility, stimulant, and other properties render it peculiarly valuable in the treatment of many disorders of a toxæmic, infectious, and adynamic character, particularly when patients are intolerant of gastric medication or in a depressed, collapsed, and insensible state, in which it has extensive and varied uses as demonstrated by the following evidence from different sources.

Thus, with other applications, Dr. Waring states (*Practical Therapeutics*), that in "*Typhus and Typhoid Fevers* and in the advanced stages of continued and inflammatory Fevers, the Spirit of Turpentine by mouth, in enemata or externally in fomentation, is a remedy of the highest value, when the vital energies are greatly depressed, *when Coma or Stupor are present, or if Delirium with Subsultus Tendinum, etc., exists.* Turpentine, either by mouth or in the form of enema, often rouses the vital powers, and exercises the most beneficial influence. *In the Tympanitis of Fever*, it also proves most essentially useful, Drs. Graves, Copland, and others speak highly of its efficacy; the former advises it in doses of f ʒ j, with f ʒ iss of Castor Oil, to be repeated every sixth hour; and the latter administers it in enemata, and applies it externally to the abdomen in fomentation. I have seen striking benefit result from its employment; indeed there are few remedies which deserve more confidence. *In Intestinal Hæmorrhage, Hiccough, etc.*, it also proves highly serviceable, removing these conditions and tranquillizing the nervous system. Prof. Huss states that, in the epidemic of Typhoid Fever which prevailed at Stockholm in 1841–2, he found Turpentine fomentations extremely useful, they were applied to

the abdomen when the diarrhœa was profuse, and to the chest when pulmonary complications existed. Its external application should never be omitted in the latter stages of Typhus. It may also be given internally with advantage. Dr. Shapter considers that in the third or last stage of *Remittent Fever*, the Oil of Turpentine, in doses of gutt. xxx, is perhaps one of the most safe and useful medicines which we can employ. He remarks, that it often immediately controls the character of the symptoms, and changes entirely the nature of the alvine secretions. Stimulants, etc., are advisable at the same time. Dr. Ward, in the treatment of the *Malarious Intermittents of Ceylon*, found great advantage from the administration of f℥ ss–f℥ j of Spirits of Turpentine (with a sufficient quantity of Castor Oil to act as a cathartic) at the commencement of the cold stage. The remedy was repeated every succeeding cold stage, and he frequently found no other treatment was required. *In the Bronchitis of Typhus Fever and other Adynamic Fevers*, the effects of Turpentine internally, to use the words of Dr. Murchison, are sometimes marvellous. In extreme cases, when the tubes are filled with secretion, the face livid, and the patient has not the strength to cough, or when other remedies fail, recourse should be had to Turpentine. It may be given as follows: ℞. Ol. Terebinth. ♏ x–xx, Ether Sulphuric, vel Chloric, ♏ xv–xxx, Spt. Juniper Co. ♏ xxx, Mist. Acacia f℥ iss, M. This may be repeated every two hours at first, until the desired effect is produced. After a few doses, the patient often begins to cough and to expectorate large quantities of viscid mucus, with great relief to the respiratory symptoms. Under its use the urine is increased."

"*In Puerperal Fever*, the internal exhibition of the Oil of Turpentine, in doses of one or two tablespoonfuls every three or four hours, in cold water, and sweetened, was first proposed by Dr. Brenan, of Dublin. He regarded it as a specific, and in this opinion he is joined by Drs. Douglass, Blundell, Copland, and other judicious practitioners. Dr. Murphy agrees with Dr. Copland in stating that there is certainly no remedy so efficacious as a decided and judicious use of the Spirit of Turpentine in doses of f ʒ ss, with Castor Oil, every three or four hours."

"*In Inflammation*, Dr. Copland observes that after watching its effects for thirty years, he believes there is no remedy more deserving of confidence, if appropriately and prudently prescribed. The operation of this medicine depends upon the dose, the frequency of repetition, and the combination of it with other remedies. Hence it may be made available in every form of inflammation."

"*In Hæmorrhage*, the Oil of Turpentine has long been highly esteemed as a styptic. Its use is generally confined to atonic and passive Hæmorrhage, but Dr. Copland considers that the existence of inflammatory action does not contraindicate its use, for it lowers, he observes, vascular excitement, and prevents effusion, and the formation of coagulable lymph, especially when given in sufficiently large or repeated doses. When the powers of life are much impaired, and after copious evacuations of blood, small and frequent doses of it only ought to be given, conjoined with tonics, aromatics, restoratives, etc."

"*In Purpura Hæmorrhagica*, Dr. Neligan employed the oil of Turpentine with invariable benefit. He gave it in doses sufficient to purge freely, which

object is more certainly obtained by combining it with Castor Oil."

Others testify to the same effect, but the hæmostatic, stimulant, and alterative effects of turpentine can in general, be obtained by smaller and more frequent doses by the mouth, rectum, and lungs in inhalation especially, without purgative or other perturbative treatment.

Further evidence is presented of its efficacy in various forms of hæmorrhage, and general experience testifies that in gastric, intestinal, uterine, pulmonary, renal, purpuric, and other forms of hæmorrhœa, especially of an atonic character, the oil of turpentine is very efficient and often of itself sufficient to arrest the bleeding as well as to correct the hæmorrhagic diathesis, but may be often advantageously combined with other remedies to meet special indications in particular cases.

Moreover, in defective or perverted secretion of the air-passages, mouth, throat, gastro-intestinal canal, and other parts, especially of the kidneys, the oil of turpentine is extremely useful, and will sometimes succeed in restoring the urinary and other secretions when the most active secernants and diuretics have failed. Besides, in serous, anasarcous, choleraic, and purulent defluxions it is a very efficient remedy exhibited both internally and externally, and particularly by *voluntary* as well as involuntary *inhalation*, when a more speedy and decided effect is required, as in chill, effluxion, and prostration generally.

Furthermore, in conditions of a necræmic, phlegmonous, putrefactive, and lethal character, it is highly useful, as for example, in "*Erysipelas*. Mr. Nunnely observes that it is certain that in some instances

where coma has been intense, the pulse sinking, the tongue dry and glazed, and the teeth imbued with sordes, after other remedies have been abandoned in despair, the administration of the Oil of Turpentine has apparently saved the patient. In extreme cases it should always be employed, and may be given in the manner advised in *Typhus Fever* (*ante*). Dr. Copland advises Turpentine fomentations to be locally applied.

"*Ulcers of the Extremities.* The internal use of turpentine appears in these cases to hasten the healing process. Mr. H. Hancock, of Charing Cross Hospital, relates a case illustrative of its efficacy. Water dressings were applied locally, and the following mixture was given internally: ℞. Sp. Terebinth. f ʒ vj, Pulv. Acacia ʒ vj, Aq. Menth. Pip. f ʒ vij, M. Sumat. f ʒ j ter in die."—(*Ibid*).

Besides atonic and chronic ulcers, oil of turpentine is specially applicable for the prevention and treatment of bed-sores, and all the disorganizing, ulcerated, gangrenous, and sloughing tendencies—internal and external, of typhoid, diphtheria, anginose, and asthenic conditions generally, in which it must necessarily be conjoined with a due supply of appropriate acid, mineral, and alimentary basic principles, essential for normal construction, nutrition, reparation, and life action.

To further exhibit the valuable medicinal applications of ol. terebinth. I present the following from the *U. S. Dispensatory*, by Dr. Geo. B. Wood:

"Oil of turpentine is stimulant, diuretic, occasionally diaphoretic, anthelmintic, in large doses cathartic, and externally rubefacient. Swallowed in moderate quantities it produces a sense of warmth in the

stomach, accelerates the circulation, and increases the heat of the skin, without especially affecting the functions of the brain. In small doses, frequently repeated, it stimulates the kidneys, augmenting the secretion of urine, and often producing, especially if long continued, painful irritation of the urinary passages, amounting sometimes to violent strangury. . . . In large doses it occasions slight vertigo, or a sense of fulness in the head, sometimes amounting to intoxication, attended frequently with nausea, and succeeded generally, though not always, by speedy and brisk catharsis. . . . In some constitutions it produces, even when taken internally an erythematic eruption on the skin."

"The oil is employed in numerous diseases. As a stimulant it sometimes proves serviceable in low forms of fever. We have found it extremely useful in the advanced stage of typhoid or enteric fever, and especially in cases in which the tongue has partially or completely thrown off its fur in flakes, and afterwards become dry, with a surface destitute of its ordinary papillary appearance, and often contracted and fissured. The remedy has, in our hands, proved almost uniformly successful under these circumstances. With small doses of the oil frequently repeated, the tongue becomes moist and again coated, the tympanic state of the bowels disappear, and the patient goes on to recover as in a favorable case of fever. . . . The medicine has been recommended as a counter-irritant in yellow and puerperal fevers, and may undoubtedly be given with advantage in the later stages of these diseases, and in other instances of gastric and enteric inflammations, which require a resort to stimulation. . . . It has also been much

extolled as a remedy in neuralgia, in epilepsy, and tetanus, in passive hæmorrhages, particularly from the bowels, in disordered conditions of the alimentary canal attended with sallow countenance, foul tongue, tumid abdomen, sour or fetid eructations, and general depravation of health, in obstructions of the bowels in chronic dysentery and diarrhœa, in obstinate gleets and leucorrhœa, in suppression of urine, and retention and incontinence of urine from debility, and in chronic nephritic and calculous affections. In certain states of dysentery, whether acute or chronic, when the tongue is quite dry, and smooth as if from defect of the papillary structure, no remedy has been so efficient in our hands as oil of turpentine. We have seen it also very beneficial in hæmoptysis. As a vermifuge it is highly esteemed especially in cases of tænia."

"The dose for ordinary purposes is from five to thirty drops every hour or two in acute, and three or four times a day in chronic diseases, administered on sugar, or in emulsion with gum arabic, loaf sugar, and cinnamon or mint water. No remedy is more effectual in tympanites than the injections of the oil of turpentine. From half a fluid-ounce to two fluid-ounces may be administered suspended by the yolk of eggs in half a pint or pint of water, or some mucilaginous fluid. Externally applied, oil of turpentine irritates and inflames the skin, and in low forms of fever with coldness of the surface, is when heated, one of the most efficacious rubefacients."

These lengthy extracts are presented to show more strongly the special adaptation of the oil of turpentine to the treatment of the inflammatory, necræmic, infectious, disorganizing, putrescent, and adynamic

states of ship, typhus, yellow, malarial, puerperal, congestive, enteric, and other fevers, with erysipelas, diphtheria, small-pox, purpura, hæmorrhages, gastro-intestinal disorders, choleraic and other defluxions, and toxæmic, zymotic, septic, contagious, and depressed conditions generally. It is thus especially indicated therein as an energetic stimulant, disinfectant, antiseptic, germicide, hæmostatic, diuretic, diaphoretic, general secernant, alterative, resolvent, and restorative. As a hæmostatic in scorbutic, necræmic, and purpuric conditions particularly, it will prove in general more useful than any other remedy as "it has been used with success in almost every form of *hæmorrhage*, but most successfully when the bleeding was passive. The special affections include *epistaxis*, *hæmatemesis*, *hæmaturia*, *menorrhagia*, *post partum* hæmorrhage, *purpura*, and the multiple hæmorrhages occurring under the influence of the hæmorrhagic diathesis. Even in external and traumatic hæmorrhages it has proved efficient. Its efficacy justifies the opinion of John Hunter, who termed it 'the best, if not the only true styptic.'"—Dr. Alfred Stille (*National Dispensatory*).

Oil of turpentine is not only thus applicable to arrest bleeding and exudation, but also to subvert the hæmorrhagic and colliquative diathesis, prevent the necræmia and transudation of the blood in its entirety from the various tissues and organs, as in scurvy, black vomit, etc., with the separate effusion of its albuminous and aqueous constituents, as in leucorrhœa, dropsy, and cholera in its various forms, in fact, in hæmorrhagic, lymphoidal, and serous defluxions generally. It is thus efficient both as a prophylactive and curative of the necræmic, transudative,

and diarrhœal disposition, and likewise of the general typhoidal and collapsing, with their concomitant fatal tendencies, though as all such abnormities depend so directly upon the ammoniacal and superalkaline dyscrasia, its efficiency may be largely enhanced therein by the conjoined use of acids, with ergot, iron, and other constringing and tonic agents. Besides, in the minor affections as a cardiac and general stimulant, etc., and substitute for alcohol, it may often be given beneficially in small and frequent doses on sugar, or in emulsion with aromatics and tonics.

From its volatility the oil of turpentine may be given more or less freely and continuously by inhalation in ordinary inspiration, by keeping a cloth saturated with it in front and near the face of the patient, as well as by its more general diffusion in the air the patient breathes, supplemented if necessary by voluntary inhalation, especially in cases of sudden depression as in cholera, yellow fever, uterine hæmorrhage, chills, and syncope from any cause, if the patient be able to make the necessary effort. Otherwise it may be given by the mouth or bowels, or both, particularly for its more immediate internal local effects upon the gastro-intestinal canal. Whenever indicated in all such diseases and depressed conditions, I thus habitually exhibit the oil of turpentine by inhalation in preference to its administration by the mouth or rectum, more or less freely according to necessity, until its specific effects are obtained, although the latter method is also conjoined or more exclusively employed where the occasional or local internal use of this valuable remedy is necessary, graduating of course, the dose and mode of administration according to the special indications therefor and

effects required, though a gentle continuous disinfectant, diaphoretic, diuretic, alterative, and stimulant influence may usually be kept up by moderate quantities steadily inhaled in ordinary breathing, better than by occasional doses by the stomach or bowels. From my own general and favorable experience therewith in the various scorbutic, necræmic, septic, typhoid, infectious, and depressed states of system, I firmly believe that the free and appropriate use of the oil of turpentine in the adynamic and hæmorrhagic states of yellow fever, as well as in cholera and allied diseases, will prove invaluable, both as a preventive and curative of some of their most dangerous symptoms and tendencies. I therefore, strongly urge its free exhibition therein, both by the lungs and stomach, or rectum, as may be required, beginning usually with small quantities and gradually increasing according to necessity, until the desired effect is secured, this, rather than the quantity used being the better guide, in every disease, always however, bearing in mind that in excess it irritates and inflames internal organs with external tissues, as well as intoxicates and enervates the nervous and general system, or induces anæsthesia, for which indeed, it may be sometimes employed advantageously, while exceptionally, as stated by Dr. Waring (*Practical Therapeutics*), "In some persons, Turpentine, in any form, or in any dose, produces very unpleasant effects: coma, intoxication, violent strangury, eruption of the skin, etc."

The beneficial influence of the oil of turpentine is not, however, thus limited exclusively to the patient, for its general diffusion in the air destroys the infectious principles therein, as well as prevents their

development and thereby protects the attendants and others exposed, against contagious miasms and diseases, as in diphtheria, typhus, small-pox, scarlatina, cholera, and others of a less virulent character, it being a potent ozoniferer, disinfectant, and germicide, as well as stimulant and restorative, but as it is inflammable it must not be too freely disseminated in the air where there is any danger of fire.

Other essential oils as of peppermint, cinnamon, eucalyptus, with thymol and their analogues, singly or combined with turpentine and other less pleasant remedies, with the juice of alliaceous plants, as of onion, garlic, etc., the activity of which depend upon an essential oil, are also applicable in adynamic fevers and conditions of system. These oils and cognate agents may also be inhaled, taken by the mouth or applied to the surface. One of the most common and useful of this class is garlic, which may be employed both as a condiment and medicine at the same time. "When it is taken internally, the oil is speedily absorbed, and pervading the system, becomes sensible in the breath and various secretions. Even externally applied, as to the soles of the feet, it imparts its odor to the breath, urine, and perspiration, and, according to some writers, may be tasted in the mouth. Its effects on the system are those of a general stimulant. It quickens the circulation, excites the nervous system, promotes expectoration in debility of the lungs, produces diaphoresis or diuresis according as the patient is kept warm or cool, and acts upon the stomach as a tonic and carminative. . . . Applied to the skin it is irritant and rubefacient, and moreover, exercises in some degree its peculiar

influence upon the system, in consequence of absorption. . . . The juice is said sometimes to check nervous vomiting, in the dose of a few drops. If taken too largely, or in excited states of the system, garlic is apt to occasion gastric irritation, flatulence, hæmorrhoids, headache and fever."—*U. S. Dispensatory.* Hence the use of the juice or oil of garlic is indicated in cholera, and other atonic serous, hæmorrhagic, catarrhal, albuminous and purulent defluxions, as well as in congestive, malarial, and low fevers, with scorbutic, collapsed, and depressed conditions generally, both exhibited internally and applied to the surface, and may be taken in food and medicine for preventive as well as curative purposes.

In the more purely hygienic with the medicinal treatment of typhus, yellow, malarial, puerperal, enteric, and other asthenic fevers, with small-pox, erysipelas, diphtheria, cholera, septic, infectious, putrescent, and adynamic states of the system in general, special effort should be made to insure the proper oxygenation of the blood, hæmatosis, chemico-organic metamorphosis, and depuration of the fluids, organs, secretions, and entire system by a due supply of *pure* air with other arterializing agents, of which oxygen, peroxide of hydrogen, and nitrous oxide will prove the most useful, though it is probable that nitromuriatic acid owes some of its efficacy to the oxygen as well as chlorine it supplies to the system, besides its compound action as an acid. Of oxygen itself little need be said, as it is well known and less active in a free than nascent state, though quite useful, but of the peroxide of hydrogen, which yields it in this condition, much may be usefully expected.

With regard to the physiological influence and therapeutical effects of peroxide of hydrogen. "Dr. B. W. Richardson, of London, found that to venous blood, deprived of its fibrin, it imparts oxygen, with an increase of heat, and a change of the color to red. Fibrin and cellular tissue cause it to evolve oxygen. Sugar and starch are decomposed by it, giving out carbonic acid. Albumen, gelatin, urea, and cutaneous tissue have no effect upon it. Injected into the left cavities of the heart of an animal, it restores the irritability of that organ, but has an opposite effect in the right cavities. Thrown into the arteries immediately after death, it restores for a time, the contractile power of the muscles, and suspends cadaveric rigidity, while it counteracts the influence of various medicinal substances that cause muscular spasm. Dr. Richardson inferred from his experiments that the peroxide might be found useful as an antidote to the narcotic poisons, as a local application to gangrenous ulcers, and as an internal remedy in low forms of fevers." From numerous trials he found it of value in various diseases, as rheumatism, whooping-cough, scrofula, bronchitis, phthisis, etc. "Dr. Richardson recommends that a solution of the peroxide shonld be used charged with ten volumes of oxygen, the dose of which may be from one to four fluid-drachms, freely diluted with water. There are so many substances which decompose the peroxide, that, as a general rule, it is best given without addition; at least nothing should be allowed to remain long in contact with it." —(*U. S. Dispensatory*).

These properties render the peroxide of hydrogen peculiarly appropriate in cases requiring oxygenation and vitalization, with disinfection and depuration of

the blood and system in general, hence applicable in typhus, yellow, malarial, bilious, enteric, puerperal, and other asthenic fevers, with variola, choleraic, toxæmic, septic, contagious, colliquative, atonic, and depressed conditions generally, especially with gastric and hepatic torpor, as according to Dr. Richardson, "*In Jaundice* it exercises an excellent effect by improving the digestion, and causing a free secretion [of bile?]"—(*Waring's Pract. Thera.*). As it also increases the secretion of urine, it is specially indicated in cholera, albuminuric, uræmic, with dropsical, and correlative abnormities. It affords a convenient method of exhibiting oxygen, and will doubtless prove useful in all cases requiring that vitalizing agent.

Nitrous oxide, in some respects, is still better adapted to the preventive and curative treatment of typhus, yellow, and other low fevers, with choleraic, septic, infectious, and malarial diseases, as well as adynamic disorders generally, particularly in the prodromic chill and concomitant depression in the acute stage, as well as before the outbreak of the disease, though it is applicable throughout in asthenia, to destroy the morbific factors and counteract the pathological tendency *ab initio*, and in convalescence to restore the normal tonicity, as it is very active in oxygenating the blood, promoting digestion and nutrition, increasing the hepatic, renal, and other secretions, depurating the body, stimulating the brain, nervous, muscular, and general system, and breaking up the malarial cachexia, with other baneful dyscrasia, promptly resolving their concomitant abnormities, and restoring healthful vigor of body and mind. Moreover, in all cases of suspended animation, prostration, or sudden collapse, as

in asphyxia, swooning, depression from exhaustion, hæmorrhage, serous and other defluxions, as well as malarial and congestive chills, transudative affections, with asthenic states and debility in general, nitrous oxide is specially applicable as a powerful counteractive, exhilerant, vitalizer, invigorant, and restorative. In particular, it will doubtless prove more actively efficient in rousing the system and exciting reaction in the collapse of cholera, and all states of depression than any other known remedy. Indeed, it is far superior to oxygen and other agents as a stimulant, tonic, resolvent, and corroborant in depressed conditions. For stimulant purposes it should be given in small and frequently repeated doses, or continuously for a time in moderate exciting quantities by inhalation or otherwise, exhilerating rather than anæsthetic doses being required for the due invigoration of the system in all forms of depression. In fact, the prompt and powerful revivifying, exhilerating, and invigorating influence of nitrous oxide upon the animal economy is so decided as to render it applicable for more varied and extensive sanitary and medicinal purposes than almost any other known agent, a specific detail of which I hope to present ere long in a special work upon the subject.

Besides these and the oxymuriatic and chlorinated preparations, with the usual alteratives, antiperiodics, and tonics, there are other agents more or less applicable in ship, yellow, malarial, and septic fevers, infectious, colliquative, and correlative diseases, as carbolic, sulphurous, and salicylic acids, with their compounds of soda more particularly, from their general neutralizing, febrifuge, disinfectant, antiseptic, antizymotic,

and depurative effects. From its mildness and efficiency as a febrifuge, antiperiodic, and tonic, and its conversion in the system into salicylous acid, Salicin is likewise appropriate in yellow fever as in cognate maladies. Iodine and bromine with some of their compounds judiciously administered, are also applicable therein, particularly the hydrobromic acid in the active febrile stage to allay thirst, quiet the stomach, and for its general soothing, antipyretic, antalkaline, disinfectant, and resolvent effects. In fact, it promises to be a most efficient and valuable febrifuge, antizymotic, antiseptic, nervine, and antiphlogistic in all acute and sthenic fevers, contagious diseases, superexcitable, and inflamanatory conditions of system, both singly and in conjunction with other antipyretic, anodyne, disinfectant and resolvent measures.

When the bowels, which are so apt to be constipated in yellow, bilious, malarious, and other varieties of fever, do not respond sufficiently to the acid medication and regimen, with the varied incidental measures, they may be relieved with small doses of citrate of magnesia or phosphate of soda, which latter may be given like common salt in broth and other food; or, perhaps better still in general, when there is much local gastro-intestinal irritation, with the more conservative laxatives of ox-gall, raw eggs beaten up in water with salt added, or the chloride of sodium separately, yeast, glycerine, olive and castor oil, and similar nutrient and emollient defecants; while in torpidity, the more active cholagogues and purgatives are applicable, as podophyllin, iridin, aloin, etc., and even croton oil, that may be readily taken in pill with little disturbance of the stomach, though free purga-

tion, and hydragogue catharsis especially, is usually objectionable in these affections from being too debilitating. Yet, croton oil is said to be quite efficient in yellow, bilious, and malarious fevers, in improving the secretion, and unloading the gall-bladder of large quantities of dark bile, though its general effect is hydragogue and energetic, but, "When its action is excessive, a draught of Lime or Lemon juice affords almost immediate relief. . . . *In the Bilious Remittent Fevers of India*, Dr. McGregor regards Croton Oil as one of the most efficacious remedies we possess. . . . He found it succeed in procuring the evacuation of vitiated bile when Calomel, Jalap, and other purgatives had failed." (*Waring's Pract. Therapeutics.*) But to avoid hypercatharsis therefrom, croton oil should be given in small doses of half a drop or less, alone or with other remedies occasionally until a moderate action is secured. When a more direct cholagogue effect is required small doses of *bi*chloride of mercury may be exhibited, calomel being dangerous in conjunction with other preparations of chlorine, though perhaps podophyllin and its analogues would sometimes be preferable. The bichloride, aloin, and others of a like character, with the more stimulant secernants and tonics, as pilocarpin for diaphoresis, quinia, strychnia, etc., may also be introduced subcutaneously, as well as by the gastro-intestinal canal, but this brings us to the consideration of surface medication.

IV.

EXTERNAL TREATMENT.

The direct application of remedies to the abdomen and general surface of the body is also a very efficient method of medication, especially applicable when the administration of drugs by the alimentary canal is objectionable. Thus the application to the abdomen of aloin, croton, castor, and other oils, hydrarg, *bi*chloride, and other cathartics and medicaments properly diluted, may be sufficient to keep up a soluble state of the bowels and favorably influence the system in general in times of emergency. The application of the mineral and vegetal acids to the surface is especially efficacious both for their local internal and constitutional effects as well as disinfectant purposes in infectious diseases, hepatitis, jaundice, bilious and malarial fevers, with torpor of liver and bowels, ascites, and other disorders, and is particularly indicated in yellow and allied fevers, in which their free application by frequent lavements or the bath, would doubtless materially help to overcome the disease and restore the patient as in corresponding disorders, in which the nitric and hydrochloric acids, or nitro-hydrochloric acid are thus so very efficient.

"Nitromuriatic acid was first brought to the notice of the profession, in consequence of the favorable report of its efficacy as an external remedy in hepatitis, made by Dr. Scott, formerly of Bombay. When thus employed, it produces a tingling sensation of the skin, thirst, peculiar taste in the mouth, and occasional soreness of the gums and plentiful ptyalism; and at

the same time stimulates the liver, as is evinced by an increased flow of bile. It is used either by sponging, or in the form of a local or general bath. When applied by sponging, the acid is first diluted so as to have the sourness of strong vinegar. When used as a foot-bath, three gallons of water, contained in a deep narrow wooden tub, may be acidulated with six fluidounces of the acid. In this the feet and legs are to be immersed for twenty minutes or half an hour. The bath may be employed at first daily and the sponging may be used at the same time. The bath is said to be effective in promoting the passage of biliary calculi. The solution prepared for a bath is acidulated with two fluid-drachms of the acid, to make up for the waste by evaporation. The bath should have a temperature of about 97°, which may be attained by heating part of the acid solution and throwing it back into the remainder."—(*U. S. Dispensatory*).

"*In Chronic Hepatitis, and in Acute Hepatitis when the acute symptoms have been subdued* by depletion and other antiphlogistic measures, Nitromuriatic Acid both internally and externally, has been used with great advantage. Mr. Annesley, who employed it extensively, placed great reliance on it, and Sir J. McGricor observes, after employing it in about 200 cases, 'one fact we are clear and decided in, that the injury to the constitution is infinitely less from the acid than from the mercurial ointment, and that men are not half the time convalescent from the first as they are from the last remedy.' It is in the form of a bath that it is most used and proves most serviceable. . . . In urgent cases a general bath to envelope the whole body may be used. If the acid-bath create much irritation of the skin the quantity of the acid

may be diminished. . . . *In Dropsy from disease of the Liver or Spleen*, much service will accrue from the Nitromuriatic Acid bath, or from sponging the surface of the hypochondria, night and morning, with a warm lotion containing these acids or from the internal use of them. (Copland)."—*Waring's Practical Therapeutics*).

Sponging and bathing the body with dilute vinegar, as well as its internal use is also very serviceable in the prevention and treatment of fevers, in infectious, septic, and scorbutic diseases. "Diluted vinegar forms an excellent lotion for sponging the body in fevers; under the same circumstances, it is an agreeable refrigerant drink, when properly sweetened; sprinkled about a sick room, it is extremely refreshing; and the vapor is useful in many affections of the throat."—(*Ibid*). Also in strong solution alone or with chloride of sodium is excellent as a gargle in diphtheria and other anginose affections. "The refrigerant influence of diluted vinegar on the surface is undoubted, it not only diminishes heat, but allays pain. *In Hæmorrhagic affections* the cold feeling which it produces on the skin is extended to the whole system, hence the benefit derived from it in internal hæmorrhages, and in inflammation of the cavities. . . . In *general fever*, sponging the body with vinegar and water is applicable in every case in which the skin is preternaturally hot, when no idiosyncrasy stands in the way."—(*Ibid*).

Vinegar is also a direct styptic and antiphlogistic, with disinfectant properties, and has long been used as a prophylactive against infectious and epidemic diseases, but it is far inferior to the mineral nitric and hydrochloric acids or their compound nitro-hydro-

chloric acid. Solutions of chlorine, chlorinated soda, and their analogues are also efficient both for external and internal use for disinfecting, preventive and curative purposes, as likewise carbolic, sulphurous, and salicylic acid, with solutions of thymol, eucalyptus, tar, and similar agents in infectious diseases as specially indicated. But as "prevention is better than cure," we will briefly consider the most appropriate means therefor relating more directly to personal purification and protection than general sanitation, which is usually thought to be all sufficient, yet is really only partially so, as it removes merely some of the extraneous, without at all touching the *intrinsic* and systemic sources of diseases, the most immediately active and prolific causes thereof in general.

V.

PREVENTION.

Much diversity of opinion exists respecting the origin, contagiousness, and transmissibility of yellow fever, diphtheria, typhoid, and other diseases of a varied zymotic, septic, and infectious character, on the border line or intermediate between the markedly contagious and benign diseases, but which, like their analogue—erysipelas, vary in degree of contagiousness according to the energy of morbific force, or intensity of disease, conditions of system, and other favoring circumstances, hence ranging from the least innocuous to the most infectious, in every grade of activity, one being converted into the other according to the power of either or both special intrinsic and extraneous pathogenic agencies. Moreover, there is much difference of opinion with regard to the spontaneous or secondary origin of such maladies, yet, this need not be, for in accord with the laws of nature, there is no valid reason why all the most malignant and contagious diseases may not originate spontaneously as well at one time as another, *cæteris paribus*, the same as innocuous disorders, their occurrence being but a matter of *conditions*, or intensity of morbific influences, and not of time, as exhibited in the spontaneous origin of puerperal fever, erysipelas, and gonorrhœa, which arise *de novo* at all times alike whenever the pathogenic factors are brought together, and may be secondarily transmitted *ad infinitum*. Hence, it is most probable, that disease of all kinds, the most malignant and contagious as well as the less infectious and benign,

originate spontaneously whenever the morbific factors and concurring circumstances are present without regard to time, person, or place, as in the beginning, this being as well in the present as at any former period, just the same as in the case of spontaneous combustion that will occur at any time or place, and the resulting fire spread indefinitely if sufficient combustible material be present, unless repressed by a counteracting power. Indeed, like combustible matter, the principal factors of the most malignant disease may co-exist, and yet, in the absence of a slight accession or additional factor, may remain quiescent and innocuous or become active by accretion, as in the case of a proximate, extending into an exciting cause of disease, and just as gunpowder or dynamite may be all perfect for action up to the very verge of explosion, yet in the deficiency of an adequate degree of heat or concussion may remain inoperative and harmless though dangerous, instead of becoming explosive and destructive from the slightest increment of temperature or force.

Thus, as certain forms of contagious with all benign diseases originate spontaneously according to the presence and activity of special pathogenic factors, why should not all varieties of disease from the least infectious to the most malignant, in like manner develop *de novo*, and even life itself, whenever the specific *conditions* required therefor co-exist? as the same elements, forces and laws, that originally produced them still exist and act as formerly. Because life or one form of disease does not originate in certain ways it does not follow that they do not arise in other ways, any more than spontaneous combustion is impossible because it does not occur in some special mode. Necessarily for

the spontaneous origin of fire, disease, and life, certain special factors are required, and without all of which no perfect evolution in either direction can result, yet with them specific action is certain. The spontaneous development of fire, life, and disease, is hence a matter of *definite conditions,* which may occur at any time in the present and future, as in the past. The same matter, force, and laws exist and act now as in the beginning, and the operation of the same influences or factors will produce the same result as well at one time as at another. Indeed, as observed elsewhere,* it is more than probable that if all fire, disease, and life, were instantly and absolutely extinguished, the latter as well as the former would again reappear in the natural order of things, in accordance with the force and laws or omnipotent power that originally produced and continues them and the universe in operation, as the laws of nature are uniform and immutable, and matter and force the same always and forever, while the same agencies will produce the same effects at all times alike.

Thus, as the development of fire, disease, and life, is purely a matter of *conditions* the elements and forces which originated them at one period, can in like manner produce them spontaneously as well at any time, as amply demonstrated in the former, by the unquestionable frequent occurrence *de novo* of fire and disease—both benign and contagious and doubtless also of life itself, though this is not so manifest, yet, presumably just as positive. Therefore, as it is evident that *all* diseases, epidemic and contagious, specific and malignant, as well as benign, may originate spontaneously at any time, anywhere, whenever concurrent

* Natural Laws of Marriage.

conditions are favorable, it is the part of wisdom and common sense to recognize the fact, and try to discover and remove the active morbific factors or producing causes thereof, to *prevent* their inception, as well as seek the means of cure and extinction after their development. While this is true of *all* disease, it is of special importance in pestilential, epidemic, and contagious maladies, of which small-pox, diphtheria, typhus, yellow fever, and cholera, are types, all of which may be prevented by due attention to *personal* hygiene, and avoidance of their extraneous as well as intrinsic causes, some of which are well known and preventable, while others may be neutralized or destroyed, though not fully determined. Thus, there is no question but that malarial disease spontaneously originates from certain baneful conditions of soil, air, and habitat, or filth, that may be avoided or subverted. Yellow fever partakes of the same nature and is spontaneously developed in a similar manner from local impurities as manifested in its occurrence *de novo* on ships, as well as in certain places constantly as the pestiferous *conditions* of its origin accumulate, the active extraneous as well as systemic causes of which may be prevented, removed, or destroyed the same as of ordinary malarial disease. Cholera is in the same category, though in its various forms, with typhus, diphtheria, and correlative maladies are dependent more directly upon avoidable morbific personal conditions, as well as extraneous agencies of filth, foul air, bad ingesta, etc. It is the height of folly therefore, to be looking outside and abroad or elsewhere for the sources of disease which exist and originate so freely within and around our own bodies, in our organization, ingesta, habits and environment.

But, in whatever way such diseases originate, the general system of prevention and protection may be summed up in the one word of *cleanliness* or *purity* of person and surroundings, of which *personal hygiene* is more directly essential than public sanitation, though the former is measurably dependent upon the latter, but for the greatest healthfulness all forms of purification are required, general and individual, extraneous and intrinsic, molecular and systemic. To this end it is not essential to know all the factors of disease to be able to counteract and obliterate them, although desirable for more certain and specific action, any more than to know the stinking elements of a pile of filth to disinfect, or remove and get rid of the whole offensive mass at once. Yet, when there is obscurity and doubt, *all* the probable morbific factors should be carefully guarded against, *intrinsic* as well as extraneous. It is not enough that all the usual general measures of sanitation have been adopted for the removal and disinfection of all kinds of filth and extraneous sources of disease, as there are potent causes thereof depending upon the alimentation, personal habits, and modes of living, as well as the special organization of the vital economy, and which within themselves, are often sufficient to engender more or less serious disorder of the system, and without which the former would prove partially if not entirely innocuous, but with both together are very destructive of health and life. Hence there must be due regard paid to proper alimentation, habits and modes of living, with *personal* cleanliness and purity of the *entire* economy, or *interior* and molecular, as well as exterior of the body, to insure healthy nutrition, depuration, tonicity, and protection of the general

system. Any person or organism surcharged with effete and noxious matter must have a depraved blood, and all the organs, functions, and secretions more or less disordered, and rendered unduly susceptible to zymotic, septic, infectious, and other grave diseases, especially to such pestilential maladies as typhus, ship, yellow, congestive, puerperal and like fevers, with small-pox, erysipelas, diphtheria, cholera in all its forms, and similar plagues, as well as a host of the minor ills of life, and all preventable.

Personal habits, ingesta, and modes of life in all climes, times, and conditions, on both sea and land, have often more to do with the predisposition to and the inception of these with other diseases, and especially in hot weather, seasons, and climates, than extraneous agencies, these latter being more or less inoperative without the former, while both combined will produce the maximum of disease and death. This is exemplified everywhere in the history of seamen, soldiers, travellers, individuals and communities, in fact human beings in every phase and state of existence, who by various irregularities of exposure, bad or improper, defective, inappropriate, or excessive ingesta, vicious courses, and otherwise, induce morbid conditions not only dangerous within themselves, but actively promotive of epidemic and other forms of disease.

Prominent among the most general and actively predisposing and exciting causes of pestilential with other diseases, are those twin curses of humanity—tobacco and alcohol, the use of which is especially noxious in hot weather and climates in producing an ammoniacal, superalkaline, toxic and corrupt condition of the blood and atonic state of the system

directly promotive of the development of typhus, ship, yellow, congestive, and other low fevers, with choleraic, septic, and adynamic disorders generally. We have shown how tobacco produces a superalkaline, scorbutic, and morbid state of the blood, both from its ammonia and nicotia, and other baneful ingredients, with depression of the nervous system and general vital energies, that renders those who use it, or are exposed to its pernicious influence specially liable to necræmic, infectious, pestilential, and adynamic diseases, thus not only of contagious, septic, and mephitic diseases, but choleraic, albuminous, hæmorrhagic, and serous defluxions of all kinds, with inanition, marasmus, consumption, paralysis, and atonic affections in general. The use of all forms of alcoholic liquors also induce a scorbutic, depraved, and poisoned condition of the blood, both directly and from consequent retention of effete matters, with mal-nutrition, mal-disintegration, aberrant innervation, with superalkalinity, morbidity, and debasement of the entire system, that render it very susceptible to epidemic, septic, contagious, and other maladies, alcoholics everywhere being the first and foremost to succumb to pestilence, as well as disease and death from ordinary causes thereof. In the case of yellow fever "Dr. Cartwright, of New Orleans, says that in one season in that city five thousand drinking men died with yellow fever before it touched a sober man."—(*Alcohol and Hygiene*, by J. Colman). But, assume that this was a mistake, and that only one-fifth or one thousand so died, that would still be a terrible mortality and unnecessary sacrifice of life, to say nothing of the concomitant suffering and misery from both the alcoholism and plague. Yet, how

much the greater must be the debasement with destruction of health and life when the baneful action of these two noxions agents—tobacco and alcohol, are combined, as is so generally the case even ordinarily, and so much the more in conjunction with the pestiferous influence of yellow fever, typhus, cholera, and other malignant maladies, as well as the minor ills of life.

The blood and body of every one charged with alcohol, ammonia, nicotia, colludine, and other poisonous agents in spirituous liquors and tobacco, as well as other noxious matter introduced from without, with the abnormal products engendered within, and retained excrementitious materials from their pernicious action upon the system, cannot fail to be disordered to such a degree as to render them unusually vulnerable to pestilential diseases and morbific influences generally. It is obvious therefore, that the use of these two potent agents of infectious, with ordinary disease, as of evil effects in general upon the physical, mental, and moral nature of mankind, should be avoided altogether, but as few will be induced to adopt this most effective and radical mode of protection, the many must necessarily bear the consequences of indulgence therein, in the concomitant illness, suffering, and degeneration, with premature and often sudden termination of existence therefrom, as well as the increased susceptibility to the usual diseases and devastating epidemics which they would otherwise escape.

The pernicious effects of these baneful agents—tobacco and alcohol, are not however, limited so exclusively to those who use them, but extend to innocent persons and abstainers therefrom, especially those

of tobacco more directly by the vicious habit of smoking, which fills the air with a poisonous miasma that people are obliged to breathe and pollute their blood and bodies with, to their more or less serious injury, as such susceptible persons are not only thus directly sickened and enfeebled thereby, but rendered more than usually liable to the various contagious and epidemic diseases, as well as the ordinary afflictions of life. But, smokers should not be allowed to thus outrage, endamage the health, and imperil the lives of others by inflicting upon them this deleterious tobacco smoke any more than the poisonous fumes of chloroform or other noxious substance. It is amazing that while so much effort is made to destroy other forms of malaria, this pernicious and all-pervading tobacco miasm is permitted to be engendered and diffused almost *ad libitum* everywhere, to the detriment of many persons, especially sickly and sensitive men, women, and children, who suffer greatly yet cannot escape therefrom. No other form of poisonous vapor would be allowed to be engendered and diffused so freely and indiscriminately as is the noxious fumes of tobacco, and as the world becomes sufficiently civilized it will be put under the ban of the law the same as other poisons. The infliction of tobacco smoke upon any one without special permission, will then, as it ought now, be treated as a criminal offense against personal right, and individual and public health, the same as the infliction of nicotia alone, or other baneful constituent of tobacco, and chloroform, prussic acid, opium, arsenic, and other poisons, either in solid, liquid, or gaseous form, is now justly treated as a crime. But, in the present state of barbarism in this respect, people must protect themselves with the young

and helpless as best they can against these smoking poisoners and the congeries of potent poisons embodied in the vapor and smoke of tobacco, as they would defend themselves and others from any one of them, and all other pestiferous agents. Moreover, while endeavoring to stay the production and diffusion of this all pervading tobacco miasm, they must also adopt the best means to overcome its pernicious effects, both immediate and remote, as well as otherwise protect against the inception of such destructive maladies as typhus, ship, yellow, bilious, enteric, puerperal, and other fevers, with diphtheria, erysipelas, cholera in all its forms, and all other toxæmic, septic, infectious, scorbutic, and adynamic diseases ætiologically connected therewith, as well as decomposing organic matter, and specific contagia, with the noxious materials engendered within the body from its baneful action, vicious habits and bad modes of living generally.

There is not only a natural endosepsis and exosepsis, but also a voluntary artificial autosepsis or self-poisoning from the wilful ingestion of these noxious agents —tobacco and alcohol, as well as enforced involuntary toxicosis, sickness, suffering, and death from the baneful miasm of the former engendered by smokers, all of which is unnecessary, inhuman, and avoidable by simple abstinence therefrom.

Hence the vital necessity for *personal* with general sanitation, and especially for purity and depuration of the *interior* with the exterior of the body, as well as disinfection of clothing, ships, docks, houses, barracks, and other places, which are usually, though erroneously, considered all sufficient, for toxic, and contagious material may be spontaneously engendered within, as well as be introduced from outside the living organism,

and be communicated to others, without the infected person or producer being sick, as manifested in vagrants, prisoners, nomads, pilgrims, and uncleanly people generally, particularly in hordes, crowded and close places, who by the offensive exhalations from their bodies, often infect others without being ill themselves, striking examples of which are afforded in the origin and spread of epidemics in the East and elsewhere, with other marked instances as in the Black Assizes of England, etc. The same condition of things exist in lower animals, as for instance, in the production and transmission of the so-called Texas fever in cattle, and in the sickening emanations from pigs and other animals. Even cleanly persons may have their bodies charged with infectious and noxious matter sufficiently to transfer to others while unaffected themselves, as is sometimes the case with the contagium of small-pox, scarlatina, diphtheria, puerperal fever, erysipelas, and other pestiferous and offensive agents, markedly with the effluvia of hospitals, dead-houses, and dissecting rooms, and the more common use of garlic, onions, tobacco, and alcoholic liquors, enough to sicken some who may be obliged to inhale the noxious and disgusting emanations from the lungs and bodies of persons surcharged therewith. A decided instance of the former is afforded in the gestative woman who may have her blood so charged with the contagium of small-pox and other diseases as to infect her child *in utero* without herself being affected, as shown in the birth of living as well as dead children with the disease. The fœtus *in utero* is doubtless thus subject to all infectious and noxious agencies that may be absorbed into, as well as those produced within the mother's blood and body, while they may also with

those engendered by herself, be given out freely enough to affect others. Indeed, it is most probable by some offensive emanation from a pregnant woman that causes the occasional so-called sympathetic sickness of stomach in the husband, similar to noxious exhalations in other cases which induce nausea, emesis, and more serious illness in many persons.

Thus in the prevention of disease, especially of contagious and infectious maladies, while due attention should be given to general sanitation to remove or destroy all the extraneous sources thereof so far as possible, special effort must be made to disinfect, purify, and protect the human or animal body itself in its *entirety*, by *internal* as well as external depuration, for every organ, blood-corpuscle, cell, molecule, and particle of the economy must be freed and kept free from noxious matter to insure the greatest safety from *intrinsic* as well as extraneous morbific agencies. People must be taught as well as compelled to avoid the *internal* with the external causes of disease, to disinfect and depurate themselves, and purify every organ and atom of their bodies *inside* and outside, so as not to become factories of infection and veritable walking pestilences, sources of affliction, disease, and death to others, which they have no more right to be, than to poison, infect, or destroy them outright. In general, this personal and systemic purity and protection may be largely effected by abstinence from tobacco and spirituous liquors with all other deleterious agents and debasing habits, by correct modes of living, with appropriate alimentation, and especially the free use of acid drinks, fruits, and food, specified elsewhere, supplemented if necessary by the more

active mineral acids, particularly the nitric, hydrochloric, or nitro-hydrochloric, the most simple, agreeable, and potent disinfectants and antiseptics, that will neutralize the superalkalinity, and correct the scorbutic, toxic, septic, and infectious condition of the blood, refresh and purify the body, destroy contagious and morbific matter, with the parasitical microzymes and vermes, promote digestion, nutrition, secretion, and depuration, and invigorate the system in general. Phosphoric acid, coffee, allium, coca (Erythroxylon), quinia, oxygen with its analogues, and like antalkalies, stimulants, disinfectants, antiperiodics, and tonics, are also preventive as well as curative of asthenic fevers and conditions of system. Their permanent stimulant, protective, and remedial influence is in marked contrast with the morbid excitement and noxious effects of spirituous liquors of all kinds so much relied on for protective as well as curative purposes, but which really disorder the stomach, liver, nutrient and vital processes, fill the blood and body with impurities, depress the nervous and systemic energies, and induce as well as promote congestive, inflammatory, septic, infectious, and adynamic diseases, especially in hot weather and climes, and during epidemics, hence should be entirely discarded.

But, the most potent and essential agent of personal with general sanitation for the preservation and restoration of health under all circumstances, is an abundance of *pure* unadulterated atmospheric *air*, the most indispensable of all forms of food and tonics, supplemented when deficient by its active constituent—oxygen, or congeners—peroxide of hydrogen, and nitrous oxide. Oxygen, the active constituent of these compounds

being the most powerful disinfectant and purifier in nature, as well as supporter of life and promoter of health. Hence, without *pure* air, or its equivalent oxygen in an available form, it is of little use to resort to extraneous means of systemic disinfection, for they must all prove more or less nugatory in the absence of the most essential element of life, health, and purity—fresh, *uncontaminated*, vitalizing atmospheric *air*. Pure water is next in importance to atmospheric air as an aliment, diluent, depurant, invigorant, and restorative, essential for solution, circulation, nutrition, internal purification and expurgation, as well as external depuration, which are powerful safeguards against infectious, epidemic, and septic maladies particularly, with fevers and diseases generally.

Thus, premising a due supply of these essentia of life and health, to avert the occurrence and during the prevalence of typhus, ship, yellow, malarial, puerperal, typhoid, and other fevers, with variola, scarlatina, diphtheria, erysipelas, scurvy, cholera, and other zymotic, septic, infectious, and allied diseases, with general sanitation, special efforts should be made to disinfect and depurate the blood and bodies of seamen, travellers, soldiers, prisoners, pregnant women, children, and people generally, exposed or subject thereto. But this systemic purification should be actively from the *interior* as well as exterior of the body, and, while it may be induced by personal effort, could be most perfectly effected under medical supervision, by the free use of vegetal, animal, and mineral acids, with corresponding antalkalies, disinfectants, antiseptics, and alimentation, and other appropriate sanitation, in an abundance of pure air uncontaminated with the tobacco miasm or other form of malaria, and water

free from impurities, with the usual personal and extraneous purification, especially in ships, quarantine, barracks, prisons, hospitals, and other places where authority prevails, though generally there would be little objection to the acid regimen and treatment, as the method is simple, safe, economical, agreeable, and efficient. Thus, with the other adjuncts, by the liberal administration of the mineral acids, the hydrochloric and nitric particularly, or better still the dilute nitro-hydrochloric acid in plain water or lemonade in the proportion of from x–xv ♏ to the juice of one lemon in a goblet of water sweetened to taste, and taken through a glass or other non-corrosive tube, every two or three hours, more or less frequently according to necessity, a marked disinfection of the blood and body may be soon effected. In conjunction therewith, acid drinks, fruit, and other food, with as much sugar as desired to reduce their sharpness and as an aliment and antiseptic, may be taken *ad libitum*, as the juice of limes, lemons, oranges, etc., with ripe tart apples, peaches, grapes, and other pulpy acid fruit that may be suitable, as likewise stewed apples, cherries, cranberries, prunes, tomatoes, culinary rhubarb, and other appropriate acid vegetals as indicated. The stimulant and antiseptic juice of onions, garlic, and like articles of diet are also useful in the more atonic conditions of system. Sour buttermilk, cottage cheese, with or without sugar as fancied, soused pig's feet and other nitrogenized food acidulated with vinegar, or like compatible acids as desired, may also be taken at pleasure, as likewise sauer kraut or its juice and similar anti-scorbutic articles so long as they are suitable and agree. For the milder scorbutic, and septic conditions of the system, the lime and lemon juice, with

sour buttermilk, and the ordinary acid fruits and food, may be sufficient to neutralizé the ammoniacal condition and superalkalinity of the blood, disinfect, and purify the body, and counteract the mephitic and infectious diathesis, without the stronger mineral acids, though these alone, or in conjunction therewith are so much the more decided, prompt, and efficient, and particularly applicable on ships, in quarantine, and times of danger.

This acid alimentation and medication is usually very agreeable, and may be continued more or less freely until the scorbutic, superalkaline, mephitic, infectious, and pestiferous condition is entirely overcome, and the entire system disinfected and depurated, which is usually indicated by persons loosing the desire for acids which is generally active in such scorbutic, toxic, and infectious states of system, as well as by the marked change in the tongue, blood, and complexion, indicative of purification and health. Besides, further evidence is afforded by the disappearance of the jaundiced hue, and offensive exhalations from the lungs and skin with regularity or tendency to looseness of the bowels; bilious, muddled and dirty aspect, with torpid liver, offensive breath, fœtid odor and constipation, being usual in such scorbutic, febrile, septic, and contagious conditions. In case, however, of exposure or tendency to typhoid fever, cholera, and similar disorders, with undue laxity of the bowels and diarrhœa, as before indicated, the more astringent disinfectants, acids, and remedies, with corresponding binding fruit juices, food, and general hygienic measures are most appropriate and useful.

The basic pathogenic factor of cholera is an ammoniacal or superalkaline state of the fluids and solids

of the system, the same as with all the other zymotic, infectious, and epidemic diseases, and may likewise originate at any time, anywhere, spontaneously, whenever the essential morbific conditions are present, or the excessive production, retention, or introduction of ammonia in the system with exosmotic action of the blood and bowels, such as heat, moisture, filth, close, confined, and poisoned air, with tobacco fumes or other malaria, the nicotian miasm itself being sufficient to induce, both as predisposing and exciting cause, all forms of choleraic defluxions, as it surcharges the blood and body with ammonia, and other alkaline and toxic matters, enervates and depresses the nervous and general system, diorders the stomach, liver, and bowels—causing dyspepsia and constipation, with alternations of diarrhœa, and nausea, vomiting, and purging, or cholera morbus, and doubtless also cholera infantum, with the most severe form of malignant cholera, independent of all microorganisms or concomitant agencies, being in itself an active *materies morbi* and cause of intestinal defluxions with other colliquative affections, and especially pernicious and energetic when a tendency thereto exists, even in those habituated to its use, and so much the more in those unaccustomed to it, with the many who cannot endure its baneful effects at all, and are readily depressed, nauseated, sickened, vomited, and purged, or afflicted with choleraic and other adynamic disorders thereby. A most potent predisposing and exciting cause of all such choleraic and correlative scorbutic, zymotic, septic, infectious, and colliquative diseases, is thus in general use in the form of tobacco, while its pernicious miasmatic smoke is almost universally engendered and diffused everywhere to the

detriment of the innocent with the guilty, so that while seeking to discover and exterminate collateral malaria and morbific agencies, this omnipresent and powerful one should not be overlooked or disregarded, but effectually extinguished or suppressed, at least so far as to protect the guiltless against its noxious influence.

Though microbes may be found connected with cholera, it is not very probable they are the primal ætiological factor of the disease, being rather merely concomitant or secondary products. As Dr. C. C. Vanderbeck justly observes (*Medical Bulletin*), "The weight of authority is against its being bacteria or microscopic life. Finding bacteria in cholera ejections does not prove them to be the cause of the disease, any more than finding skippers in cheese proves them to be the cause of cheese degeneration. We must not forget that dirt is favorite soil for low forms of organic life, and suitable food for disease germs, and that bacteria and disease germs may be, very likely are, different things, existing in the same suitable medium for their development.

Now the basic element of dirt and pabulum for the development and support of microzoa is ammonia, and as a superalkaline condition of the system is the ætiological substratum of cholera with all other cognate diseases, it is most probable that it is the primal and superinducing morbific factor thereof when in excess, without any specific poison or microzyme, but merely any general influence that will induce irritation, congestion, and defluxion in the bowels superadded as in ordinary diarrhœa. Thus, in fact, merely the ordinary causes of diarrhœa intensified, in conjunction with the ammoniacal and superalkaline dyscrasia, are

doubtless sufficient to develop malignant cholera as well as cholera morbus, cholera infantum, and diarrhœa, or different degrees of choleraic defluxion, as it often occurs sporadically in different parts of the world, and may become infectious and epidemic when this superalkaline predisposition exists in many persons to a sufficient degree for the secondary as well as primary development of the infecting principle and microzymes, which may then find lodgment in such suitable alkaline bodies and soils for propagation and activity, in the absence of which they would either be undeveloped, inert, or die out, the cholera or hæmic and intestinal flux being an active conservative process to rid the blood and bowels, and eliminate from the system, the excessive alkaline, poisonous, and infectious, or irritant matter therein, though the expurgatorial action is apt to become so excessive as to seriously disorganize the blood, depress the vital energies, and often speedily destroy life, all of which may be prevented by subverting the basic superalkalinity and primal morbific cause of this with allied diseases by acidulous and antalkaline alimentation and medication, and correct modes of living.

The alkaline basis of cholera has been recognized, but apparently merely in a general way, the more specific causative influence of the volatile organic alkali—Ammonia—being overlooked as the prime underlying morbific factor and direct basic pabulum vitæ for the development and activity of the infecting poison and microzymes or secondary pathogenic agencies thereof with correlative diseases.

Thus, recently among other conclusions from a study of "a vast mass of accumulative evidence" upon the subject, Dr. Frank W. Reilly, while he

admits and limits the spontaneous origin of the cholera poison and disease to India "only," though it is obvious they may develop anywhere whenever the essential factors therefor are present and as proven by the occasional occurrence *de novo* of sporadic and epidemic cholera in different parts of the world, says in a report to the Surgeon-General of the U. S. Marine Hospital Service (*Jour. Amer. Med. Assoc.*, Sept. 22, 1883): "To set up anew the action of the poison alkaline moisture and a decomposing temperature are required, fluid of decided alkaline reaction hastening the process, the reverse retarding. Favorable conditions for the growth of the poison are presented (1), in ordinary water containing nitrogenous organic impurities, alkaline carbonates, etc.; (2) in decomposing animal and vegetable matter with an alkaline reaction; (3) in the alkaline contents of the intestinal portion of the alimentary canal.

"A cholera ejection, or material containing such, is harmless, both before the appearance and after the disappearance of bacteria, but is actively poisonous during their presence." Yet this may be in consequence of the presence of their ammoniacal pabulum and toxic concomitant, in the absence of which they are undeveloped, or starve.

"The poison is destroyed naturally either by the process of growth or by contact with acids; (1) in water or soil; (2) acid gases in the atmosphere; (3) the acid secretion of the stomach.

"It may be destroyed artificially (1) by treating the cholera ejections or material with acids; (2) by such acid (gaseous) treatment of contaminated atmosphere; (3) by establishing an acid diathesis of the system." From these propositions he is convinced "that the

mineral acids may be relied upon as a certain means of preventing the spread of Asiatic cholera."

In reviewing the subject Dr. Vanderbeck remarks (*ante*): "For the purpose of disinfection, nitrous-acid fumes and burning sulphur are indicated. As to the acid medication, it has received the indorsement of all the best observers and practitioners having experience in cholera epidemics. It is particularly insisted upon as a preventive. If the disease should break out on ship-board, besides isolating the patient, and acidulating all his discharges and surroundings, the crew and passengers should be placed on sulphuric acid lemonade. This rule can be applied to army hygiene, and to city and dwelling sanitation." It is also of universal application in personal and public sanitation.

With other sanitarians the same writer enforces the necessity for cleanliness. "With many diseases dirt seems to favor the vitality of their germs and it is without the shadow of a doubt the case in the disease under consideration. What is the inevitable conclusion then? to starve out the poison is to be clean—cleanliness in the strictest sense, clean persons and clothing, clean houses, cellars, and drains, clean sewers, streets and rivers, clean food and drink. Cleanliness, ever the sheet anchor of hygiene, is preëminently so in cholera seasons and epidemics."

Moreover, not only to subvert cholera, but all other pestilential as well as ordinary innocuous disease, is cleanliness of primal and supreme importance, and above all clean *air* and purity of the blood and body, or *personal* sanitation in its entirety. Yet, how can this be secured when the air is freely contaminated with the noxious tobacco miasm that so actively alkalizes and poisons the fluids and tissues of the living

economy, depresses the nervous and vital energies, promotes mal-nutrition, anæmatosis, corrupt metamorphosis, and toxic condition of the system, with purpuric, hæmorrhagic, serous, and intestinal fluxes, and specially predisposes to, and excites disorder of the stomach, liver, and bowels, diarrhœa, cholera morbus, cholera infantum, and malignant cholera, with other pernicious maladies, as well as many minor abnormities. Hence, it is vitally important to discard and avoid this poisonous tobacco miasm with all other forms of malaria and toxic agencies, or causes of diseases, while to counteract the superalkalinity of the system and tendency to cholera with allied intestinal and other affections, astringent and tonic acids with corresponding neutralizing, disinfecting corroborants and regimen are required.

Thus, it is apparent that an ammoniacal and alkaline dyscrasia develops the pathogenic causes and microbes of cholera with other diseases. Even for the support of the claimed cholera bacillus, Koch found that it requires an alkaline medium, and is readily destroyed by heat, dryness, and acids. But, it has been ascertained that the so-called comma-bacillus is not peculiar to cholera at all, or even to disease, as a similar or indistinguishable spirillum exists in the mouths of healthy people. Thus it is stated by Dr. H. Raymond Rogers (*Jour. Amer. Med. Assoc.*, Oct. 18, 1884) that the so-called cholera microbe of Koch is now found *where cholera does not exist*, and, too, as Dr. Koch informs us, *in other epidemic diseases.* All diagnostic or therapeutic significance is removed from this microscopic object. "Besides, Surgeon Major Timothy Richard Lewis, M. B., Assistant Prof. of Pathology in the Army Med. School (Netley), states in the

Lancet, Sept. 20, that comma-like bacilli identical in size, form, and in their reactions with aniline dyes, with those found in choleraic dejections, are ordinarily present in the mouths of perfectly healthy persons."

From his experiments on animals, which are detailed in the *Indian Med. Gaz.*, April, 1884, the *Lancet* states, (*Jour. Amer. Med. Assoc.*), that Mr. Vincent Richards found that "Decomposing choleraic discharges had no effect on pigs, but as in other instances, the administration of recently-passed stools proved more or less rapidly fatal, with symptoms of asphyxia. Mr. Richards concludes that the alvine discharges at certain stages of cholera contains a powerful poison, whose chief action is to enfeeble and destroy the function of respiration. The rapidity of its action excludes it from being an organism, and he thinks that it is a chemical compound, probably of albuminoid nature. It remains for chemistry to isolate the body, and for experiment to determine accurately its physiological action; but Mr. Richards thinks that it will probably be found to be easy to disinfect the evacuations by permanganate of potash."

It is thus most probable that the contagia of cholera with all correlative affections are of a specific chemico-organic nature evolved from nitrogenous and ammoniacal matter both within and without the vital economy, and partaking of the character of the toxic ptomaines, which may be engendered or introduced in the circulation and gastro-intestinal canal, the choleraic tendency being apparently superinduced by some poisonous agent in the blood as well as bowels. Hence this cholera poison may be of the same nature as the toxic ptomaines, which Prof. R. N. Wolfenden says (*Ibid.*) "are developed in the body, post-mortem,"

and which are of "an alkaloidal character, and can be obtained also by decomposition of albumen, peptone, casein, muscle, brain, etc. Moreover they seem to be present in some normal secretions (saliva and urine). Probably the production of ptomaines within the living body may be the pathological cause of many obscure conditions, especially those following on poisoning by bad blood, such as stale fish, etc."

Stale and tainted meat, fish, shell-fish, and other decayed food, are very apt to cause gastro-enteric disorder with vomiting and purging, cholera morbus, diarrhœa, or choleraic and other affections, which may be dependent upon such occult poisons, as well as their indigestible character.

They may doubtless also be introduced through the lungs, as these poisonous alkaloidal ptomaines are volatile and allied with ammonia, and are neutralized and destroyed by acids, for according to the same authority "they are often amorphous in form and alkaline in reaction, for the most part volatile and easily alterable, forming chrystalline salts with acids as a rule. The addition of acids to them usually changes them, with the production of pleasant odors like orange flower, musk, etc., allowed to oxidize by contact with atmospheric air, they emit disagreeable cadaveric or urinous odors." As they originate from nitrogenous and ammoniacal matter, they may be re-converted into ammonia and like it volatilize and decompose when exposed.

Furthermore, as bearing upon this subject, Dr. G. V. Black, of Jacksonville, Ill., has presented the ingenious view (*Jour. Amer. Med. Assoc.*, Sept. 13, 1883), that microphytes develop poisonous morbific matter like mushrooms and other macroscopic plants,

thus, "pathogenic micro-organisms by their re-moleculization of matter, form poisons of the nature of the alkaloids, which are the active agents in the production of disease." But, for this purpose these microbes must have nitrogenized matter of which the elements of ammonia are the basis, hence both directly and indirectly, micro-organisms, toxic ptomaines, contagia, septic, and other poisonous principles, are all dependent upon ammonia as the basic *fons et origo mali*, whenever it is sufficiently abundant to supply the necessary pabulum, and stimulus for their spontaneous or secondary development and transmission.

Thus, with all other zymotic and infectious diseases, whether cholera is dependent upon an ammoniacal or superalkaline state of the blood, gastro-intestinal canal, and general system, a specific contagium, toxic ptomaine, organic or chemical poison, or special bacillus, or all together, as they are apparently intimately connected, the basic and specific acid and antalkaline treatment is indicated and has empirically proven most efficient both for prophylactive and curative purposes therein. Hence, in cholera and like gastro-intestinal disorders, astringent acidulous drinks and medicaments are thus most effective, especially phosphoric acid and its compounds of iron and lime, and plain or aromatic sulphuric acid, which is one of the most useful both chemically and clinically as an antalkaline, astringent, germicide, antiseptic, and tonic. This, with other acids being destructive of microzymes and subversive of their basic pabulum—ammonia, and its toxic concomitants, as well as counteractive of their morbific effects. It is especially corrective of choleraic affections and has

been employed to purify the drinking water particularly, but also exerts a beneficial antidotal, detergent, and protective effect upon the system. For instance, as stated (*Philadelphia Ledger*) this was put in use at the Philadelphia Gas Works in 1849, by direction of Dr. C. M. Cresson. The workmen employed at the Gas Works were directed to add to each pint of Schuylkill water one or two drops of sulphuric acid, which was furnished them for the purpose. "So far as my knowledge goes," Dr. Cresson says, in a pamphlet on Drinking Water, published in 1875, "and I was constantly at the Gas Works during that summer, not a single case of cholera occurred among them, although the employment, location, and habits of the men predisposed them and favored an attack of the epidemic, of which they were in the midst."

Plain or aromatic sulphuric acid may often be advantageously added in appropriate doses, to common tea, without milk, duly sweetened. Tea alone being an exhilarating and constipating beverage, and with the acid forms a pleasant antalkaline, antizymotic, antitoxic, astringent, and tonic drink, acceptable to children as well as adults, that may be taken more or less freely according to desire and necessity, with due regard to the protection of the teeth, both for preventive and curative purposes in diarrhœa, cholera infantum, cholera, and other gastro-intestinal defluxions, serous, hæmorrhagic, catarrhal, or purulent, as in typhoid fever, dysentery, enteric and other profluvia of phthisis, with analogous fluxes from the genito-urinary and other organs. When a more stimulant effect is required phosphoric acid and its compounds of iron and lime are applicable, with other constringing tonics as indicated, where there is a tendency to looseness of the bowels, or diarrhœa and cholerine.

Vinegar is also a useful astringent acid, antalkaline, germicide, antiseptic, diuretic, and sanitive, applicable both as a preventive with the food and drink, and remedy in choleraic defluxious. In sweetened, plain, barley, or other water it forms a pleasant, antalkaline, and prophylactive drink, and as a condiment with the food aids digestion, and promotes normal action of the stomach, liver, and bowels. As a remedy for diarrhœa it is said to be quite efficient by Dr. T. E. Stellwagen, (*Med. and Surg. Reporter*) in the form of cider vinegar preferably, in the dose of about two ounces undiluted for an adult. It may also be given to infants, in the dose of a teaspoonful of moderately diluted vinegar to a babe a year old. "Its effect is to check pain, tenesmus, and tormina, at once, to relieve the chilliness and cramps, when present, and to disseminate a feeling of warmth and comfort over the body." Hence may prove restorative as well as preventive in cholera. Aromatic, and camphorated vinegar are also indicated therein. Dilute acetic acid or perhaps better its impure form of pyroligneous acid, as it contains creosote, with carbolic acid and its analogues, will doubtless prove useful in cholera with other gastro-intestinal fluxes and disorders of the alimentary canal and general system. In general, astringent acids particularly, are very efficient in scorbutic, superalkaline, and bilious diarrhœas.

For the active flow of diarrhœa and choleraic fluxes with collateral states, I have found the following very efficacious in arresting the profluvia and correcting the intestinal disorder: Plumb. acetas, gr. iss, camphor gr. j, opium and carbolic acid (cryst.) each one quarter of a grain, combined in one pill, (to which may be added calomel if desired,) and taken every

hour or more or less frequently according to necessity, with sometimes in conjunction therewith a suppository of three grs. of acetate of lead to one half gr. of opium combined with five or more grs. of cacao butter, introduced into the rectum after each discharge until it is checked, yet, if used too freely they will contract the bowels unduly, and produce discomfort and general sedation.

To prevent and overcome the depression and other concomitants of gastro-intestinal fluxes, with choleraic and allied affections the more or less free *voluntary inhalation* of the oil of turpentine is also very useful in connection therewith. It is highly probable that in cholera, as well as other depressed conditions, the *active* inhalation of the oil of turpentine will be decidedly efficient, as it thus directly enters the blood, acts promptly and generally as a potent stimulant to the heart, circulation, and nervous system, subverts congestion, disorganization, and effusion of the serum of the blood, promotes the secretions and especially of the skin and kidneys usually suppressed in that disease, increases the heat, tendency to the surface, and energy of the body, and will doubtless act effectively in creating a diversion from the gastro-intestinal canal, counteracting the systemic depression, torpor, and typhoid tendency, and rousing a sufficient degree of vital power to excite reaction and overcome the disease altogether, though of course, it may be exhibited by the mouth and rectum, as well as by external application directly and in hot baths, and be aided by other appropriate remedies.

"*In Cholera*, the Spirit of Turpentine applied by means of hot flannels, and by diligent friction over the abdomen, is one of the best external applications

which can be resorted to. It may also be administered in the form of enema; thus employed it has proved in many instances highly serviceable, stimulating the system, allaying the vomiting, and causing a degree of reaction which other remedies fail to produce. I would also strongly advise its internal exhibition in the manner and doses advised in hæmorrhage. In the stage of collapse, its external application should never be neglected."—(*Waring's Pract. Thera.*)

Nitrous oxide is also strongly indicated both for preventive and curative purposes in cholera as in allied abnormities, to preserve and restore the integrity of the blood, oxygenation, hæmatosis, calorifaction, and circulation, increase the tonicity of the heart, nervous and muscular system, subvert abnormal defluxion from the blood and bowels, promote normal secretion of the liver and kidneys especially, and stimulate and invigorate all the functions of life. It will no doubt prove as actively efficient as an exhilarant, tonic, revivifier, reactive and restorative in cholera, as in correlative depressed and collapsed conditions, and adynamic diseases, given in frequent small and stimulant doses and continued so long as required. Oxygen is likewise useful for the same purposes, but is not so stimulant and active as nitrous oxide. Peroxide of hydrogen will doubtless also prove useful in cholera with cognate diseases.

These more purely physiological means of protection and restoration in cholera with all correlative diseases are especially indicated therein, as they are potent disinfectants, stimulants, resolvents, tonics, and restoratives, of general application, with appropriate alimentation, also of prime importance. Thus, for instance, in gastro-enteric affections particularly as

typhoid fever, cholera, diarrhœal, and similar disorders, such acidulous, astringent and constipating fruit juices, jellies, and food, as oranges, peaches, bananas, persimmons, quince, blackberry, and like acid and constringent vegetals, with gum arabic, rice, barley, etc., in infusion and more consistent form, strong tea plain or acidulated, and still better milk, usually hot and peptonized, though it may be taken at any temperature desired, with lime water or sulphite of lime, bicarbonate or bisulphite of soda, in small quantities at a time, and other albuminous and amylaceous diet of a binding nature, are best, laxative fruit, food, and other substances being contraindicated in such intestinal profluvia.

Wearing a thick flannel bandage around the abdomen, or better, warm woolen underclothing is preventive and corrective of diarrhœa and choleraic defluxions, during the existence of which a recumbent position is all important, the upright position being dangerous and sometimes causing sudden death. In the collapsed state of cholera elevating the lower part of the body so as by gravitation to increase the quantity of blood and stimulus to the heart and brain, is recommended by Dr. H. Raymond Rogers, of Dunkirk, N. Y. As the inverted position with the head lower than the body and limbs, is so very useful in depression from anæsthesia, hæmorrhage, and otherwise, it will doubtless prove beneficial in the collapse of cholera with all other forms of syncope. Artificial heat to preserve and restore the normal temperature of the body is also often necessary by warm dry air, hot and stimulant applications to the surface, massage, etc.

In the preventive and restorative treatment of cholera with allied zymotic, septic, and infectious

maladies, the more volatile antalkalies, acids, disinfectants, and germicides, as chlorine, phenic, sulphurous, and sulpho-carbolic acid, with thymol, eucalyptus, and other essential oils are also applicable both internally and externally. They may be readily diffused in the air and thus more or less freely inhaled as potent antiseptics, counteractives, depurants, and destroyers of both extraneous and internal microzymes, alkaline, toxic, and infectious matter. The diffusion of turpentine with other essential oils in the air, will also engender ozone, a most powerful disinfectant, germicide, and nullifier of noxious and contagious principles.

With the internal oxygenation, antisepsis, and depuration, external disinfection and purification of the surface of the body is also important in all cases and times, by the usual bathing in fresh, or often better, medicated water, as sponging or baths of salt or sea-water, solutions of the various mineral and vegetal acids, and other agents as chlorine, chlorinated, or sulpho-carbolate of soda, tar, turpentine, etc., properly diluted.

This basic acid and antalkaline medication and regimen with their allied agencies are thus applicable in the prevention and treatment of yellow fever and cholera as in ship, typhus, remittent and malarious, bilious, enteric, puerperal, scarlet, and other fevers, with small-pox, diphtheria, measles, erysipelas, carbunculoid, gangrenous, and mephitic conditions generally, they being very efficient in all such zymotic, septic, infectious, scorbutic, and putrescent diseases according to my experience with that of others previously indicated, and will doubtless prove as specific in the former as in the latter, when properly

adapted thereto, for while in general, this acid and antalkaline treatment is basic and specific in all such maladies, as before noted, it requires to be modified and supplemented to meet the varied indications in the special phazes and complications of these ammoniacal, superalkaline, infectious and malignant diseases, in accordance with their specific character, morbid manifestations, and complexities, without, however, changing its fundamental nature and applications thereto.

Thus, by the general adoption of the sanitary and medicinal measures herein presented for preventing and destroying the immediate *personal* as well as remote causes—internal and extraneous, and counteracting the active basic predisposing and exciting ammoniacal, superalkaline, and concomitant toxic, malignant, and microbic conditions of all zymotic, septic, contagious, pestilential, putrescent, and adynamic diseases, much unnecessary sickness, suffering, and sacrifice of life, with their concomitant evils throughout the world may be prevented, while individual and public health will be promoted, and human energy, activity, happiness, prosperity, progress, and civilization, proportionately increased. But to this desirable end every one must be *self-helpful* by avoiding all deleterious agents and vicious habits, and by continuous and adequate disinfection of their *entire* system—inside and outside—so as to depurate and purify most effectually every blood-corpuscle, cell, part and particle of their bodies, as well as to preserve the purity of the air they breathe, the water they drink, the food and other ingesta they take, with clothing, ships, habitations, and surroundings generally. Thus by correct modes of living,

appropriate alimentation, aeration or oxygenation and purification of their own bodies and environments, people can largely protect themselves from these destructive scorbutic, contagious, epidemic, malignant, and mortiferous diseases with the minor ills of life, and realize most fully the truth of the old Salernian oracle that he

> "Who guards his health, his life in turn makes sure,
> Prevention far surpasses any cure."
>
> Ondroneaux's Trans. *Exhortatio Sanitatis.*

VI.

CONCLUSIONS.

Having thus presented a very general outline of the basic ætiology, pathology, and treatment—both preventive and curative, of typhus, ship, yellow, remittent, bilious, puerperal, enteric, and other fevers, with cholera, diphtheria, scarlatina, small-pox, purpura, scurvy, erysipelas, gangrenous, carbunculoid, and scorbutic, zymotic, septic, infectious, pestilential, malarial, mephitic, putrescent, and cognate diseases generally—the most virulent maladies that afflict and destroy mankind and the lower creatures, for a more specific and systematic exposition of the subject I add the following summary of my conclusions thereon.

I. That the living organism is composed of various chemical elements, prominent among which are the fixed alkaline bases and metals,—calcium, sodium, and potassium, an excess or deficiency of which results in abnormal states or disease that is variously manifested and complicated.

II. That, besides the metallic oxides or fixed alkalies —calcia, soda, and potassa, which are always introduced from without the body in various forms and combinations, there is another prominent alkali—*Ammonia*, differing materially from the others in being unstable, volatile, and organic, that is both engendered within and introduced from without the living organism.

III. That, in excess in the vital economy, these alkaline substances induce various abnormal conditions primarily manifested in a morbid crasis or dyscrasia of the blood and body, which for brevity and

convenience may be termed in general, *superalkalæmia*, of which there are several varieties corresponding to the special alkalies, that may be respectively designated thus, from an excess of lime—*Calcæmia;* of sodium—*Natriæmia;* of potassium—*Kaliæmia* in conformity with that of ammonia—*Ammonæmia*, and others of a like tenor.

IV. That, each one of these forms of superalkalæmia, though with the same general basis of superalkalinity, is attended with distinctive constitutional and local manifestations and complications of disease, as of lime or Calcæmia, in diminished secretion, consolidation of tissue, calcarious and osseous degeneration; of sodium and Natriæmia, in concretions and arthritic deposits of urate of soda or chalk stones, with secondary inflammation and neuroses, as in gout, etc., though sodium is primarily liquefacient and scorbutic but not to the same degree, as potassium in excess, or Kaliæmia, which causes solution and increased fluidity, with degeneration, and *passive* defluxion of the blood, and scurvy, purpura, and similar disorders of a non-febrile and non-inflammatory character but disorganizing and asthenic tendency. While an excess of ammonia or Ammonæmia, also induces undue solvency, fluidity, and scorbutic deterioration of blood with a disposition to *active* serous, hæmorrhagic, febrile, inflammatory, and dissolutive conditions, both general and local, of a toxic, septic, contagious and primal sthenic, but ultimate and general adynamic type.

V. That, these respective dyscrasia may be produced at will by the free administration of these alkalies, and are often induced fortuitously in the over-indulgence of ingesta containing them, as impure water with ammoniacal or organic contaminations, and

saline waters, liquors, and food, with much lime, soda, and potash, as in mineral waters, wine, salted meat, with tobacco in its various forms, as well as the undue use of the former medicinally, and all of which may be variously combined, thus giving rise to diverse and complex forms of disease—acute and chronic, of various types and degrees of intensity, though of a general asthenic character.

VI. That the most noxious of these alkalies are potassa and ammonia, which though in general similar in their basic acrid and liquefacient action upon the blood and tissues, differ widely in their special effects and morbific manifestations on the system. Potash being solvent and *sedative*, in excess, depressing to the heart, circulation, nervous, muscular, and general system, hence induces *passive* necræmia, congestions, hæmorrhages, defluxions, disorganization, and enervation, with corresponding diseases of a low grade, as scorbutic and purpuric affections without much if any, fever or excitement. While Ammonia with like solvent effects upon the blood and tissues is *stimulant*, in excess, irritant, inflammatory, disorganizing, and prostrating, exciting, and irritating the heart, blood-vessels, circulation, organs and system generally, hence causes *active* congestions, serous effusions, hæmorrhages, inflammations, fevers, and defluxions of every variety and degree, with a mixed form of sthenic and asthenic disease, the latter preponderating from its diffluent and disorganizing effects upon the fluids and solids of the body. The baneful action of both these alkalies are often combined from bad habits and modes of living, as well as accidentally, with corresponding complexity of disease.

VII. That, while the fixed alkalies are introduced *only* from without the body exclusively in the ingesta, Ammonia being an organic volatile alkali formed by the direct union of its gaseous constituents in the normal chemico-organic reactions of the elements of the body is largely generated and retained within the vital economy as well as more or less freely introduced from without the system, especially in such noxious ingesta as tobacco with its vapor and smoke, impure water and air or malaria from extraneous decomposing and other matter, or even by its re-inspiration after exhalation in close places. Hence ammonia is more apt to accrue in excess within the body and rapidly and frequently cause disease than other alkalies, particularly in hot weather, seasons, and climates, or undue exposure to artificial heat, both dry and with moisture, and periods of overactivity of system, impure air in confined places, defective alimentation, and bad habits and modes of living at any time and place.

VIII. That when Ammonia accumulates to a certain extent in the body, whether from undue chemico-organic evolution or retention within, or extraneous introduction from without the economy, or all together, it causes a diffluent disorganizing, and pyrexial condition of the blood and tissues, with a scorbutic, toxic, necræmic, phlegmonous, febrile, pyæmic, septic, infectious, mephitic, and colliquative state of system in various degrees of intensity and activity, excites with minor disorders, congestive and inflammatory action in different organs and parts of the body with fever of a stheno-asthenic type as manifested in various eruptions, anthrax and carbunculoid affections, serous, albuminous, and hæmorrhagic defluxions, as anasarca, diarrhœa, cholera, albuminuria,

leucorrhœa, bronchorrhœa, epistaxis, hæmoptysis, hæmaturia, hæmatemesis, and hæmorrhage from the gums, bronchia, bowels, uterus, and skin, and into the internal tissues with apoplexies of lungs, brain, and other parts, or scurvy, purpuric, hæmorrheal, purulent, and colliquative diathesis, and such abnormities as lithæmia, uræmia, erysipelas, diphtheria, inflammation of stomach, liver, and other organs, with gastric, bilious, remittent, puerperal, enteric, and the more malignant congestive, typhus, ship, yellow, and allied fevers, with typhoid, contagious, mephitic, pestilential, and scorbutic diseases generally, all of which result more or less speedily and intensely from heat, moisture, filth, impure air and water, with other baneful ingesta and conditions that largely increase the evolution, retention, and increment of ammonia within the vital economy, especially in close and crowded places, as strikingly exemplified in the rapid development of ammonæmia, septicæmia, and contagium in the surviving prisoners of the infamous "Black Hole of Calcutta," who after escaping speedy death from suffocation, were immediately attacked with a malignant typhus fever. Besides the property of ammonia to induce a scorbutic, solvent, and necræmic condition of the blood and typhoid state has been observed by many and experimentally demonstrated by its artificial introduction into the animal system by forced inhalation and swallowing by Dr. B. W. Richardson.—(*Waring's Pract. Thera.*)

IX. That, Ammonia is the basic agent and principal morbific factor of all the varied scorbutic, zymotic, septic, infectious, necræmic, pestilential, and putrescent maladies, with mephitic, choleraic, and cognate diseases in general, local as well as systemic, its

resultant ammonæmia and concomitant purpuric, typhohæmic, and septicæmic dyscraia, being the sole cause of many, and the underlying chemico-toxic condition upon which the infecting principle and malignancy of all depends, from the slightest abnormity to the most contagious malady, in every degree of activity, intensity, and complication, according to its quantity, rapidity of evolution, retention, and susceptibility to its noxious influence, abnormal tendencies, and concurring morbific agencies of heat, moisture, malaria, contagia, climate, weather, exposure, defective dietary, bad habits and modes of living.

X. That, besides the natural internal systemic and extraneous sources thereof from organic transformation and decomposition Ammonia is largely artificially engendered and introduced into the body in the pernicious juice, vapor and smoke of tobacco with its other noxious ingredients, which produce a special form of blood-poisoning and toxicosis from the separate and combined action of its baneful constituents that are both of an irritant and depressing or acro-narcotic character, thus causing and helping to induce a superalkaline, toxic, and perverted condition of the fluids and solids of the economy, with general inanition and adynamia, productive and promotive of scorbutic, purpuric, necræmic, septic, mephitic, infectious, and other corrupt and asthenic states of system.

XI. That, in general, in various ways, chemically by adding ammonia, nicotia, and other noxious matter to, alkalizing, poisoning, preventing the oxygenation, and polluting the blood, irritating the lips, mouth, throat, air-passages, lungs, heart, and genito-urinary organs, debilitating the gastro-intestinal canal

and chylopoietic viscera; and, dynamically depressing the brain, nervous, muscular, and general system, tobacco disorders every organ and function of the economy, and acts as a powerful predisposing and exciting cause of local and constitutional, physical and mental disease, as manifested in ptyalism, cancerous affections of lip, tongue, and nares, ulcerations of mouth and throat, diphtheria, cynanche maligna, laryngeal and pulmonary phthisis, dyspepsia, torpid liver and bowels, biliousness, piles, nausea and vomiting, constipation and diarrhœa alternately, cholera morbus, cholera infantum, and doubtless also malignant cholera, mal-nutrition, marasmus, mal-disintegration, neuralgia and paralysis of face and heart, angina pectoris, adynamia of brain and nervous system, neurasthenia, melancholy, insanity, dementia, blindness, deafness, and paralysis of ganglionic and sensori-motor functions generally, with bronchorrhœa, leucorrhœa, albuminuria, and Bright's disease, abnormal production and retention of excrementitious matters in the system, toxæmia, lithæmia, uræmia, superalkalæmia, and scorbutic condition of the blood, promotive of purpura, typhus, ship, yellow, congestive, puerperal, enteric, and other asthenic fevers, with hæmaturia, hæmoptysis, hæmatemesis, and hæmorrhagic, septic, mephitic, choleraic, infectious, and adynamic affections generally, particularly when there is a special epidemic tendency thereto.

XII. That, tobacco is particularly dangerous to sickly and sensitive people, children, and pregnant women, as it induces and intensifies both organic and functional diseases and tends to entail a degenerate organism upon children of nicotized parents, as well as to destroy them before and after birth, for the vapor

and smoke of tobacco directly enters the blood of pregnant and nursing women as of others, and causes uræmia, sickness of stomach, miscarriage, uterine hæmorrhage, puerperal eclampsia and fever, with other abnormities, as seen in the maladies and frequent abortions, and post partum sickness and death of the offspring of women who work in tobacco factories. Besides, how can children whose bodies are charged with this potent tobacco poison both before and after birth from their mother's nicotized blood and milk, as well as directly from nicotized air, be properly organized or live, and normally develop when exposed to such a noxious agent that sickens and destroys adult human beings with the lower forms of life? Would pregnant or nursing cows with their calves be thus exposed to the pernicious fumes of this powerful poison, and are human beings of less importance than cattle?

XIII. That, thus in various modes, tobacco produces functional and organic, hereditary and acquired, acute and chronic asthenic diseases of the blood and body, undermines both physical and mental health, destroys the tone and stamina of body and mind, and saps the very foundations of life, inducing a state of toxicosis or *Nicotism* analogous to alcoholism, and often of itself suddenly as well as slowly terminates the existence of those who use or are exposed to it, there being little doubt but that some at least, of the many sudden deaths attributed to rheumatism, disease or paralysis of the heart, syncope, apoplexy, palsy, collapse, etc., are the direct result of *nicotism* of the heart, blood, brain, nervous and general system, and either slow or speedy, a species of suicide or homicide, or both, according to whether inflicted upon self alone

or others combined, hence the use of this potent poison should be entirely discarded.

XIV. That, nicotism of the heart, stomach, kidneys, brain, nervous, and general system, with its concomitant nicotæmia and general extraneous sources of alkaline, poisonous, and depressing agents inhaled and otherwise ingested in the body, superadded to the internal organic development of ammonæmia, toxæmia, and septicæmia, from the undue production and retention of ammonia, with other noxious and excrementitious matter in the economy, proportionately increase the tendency to, and promote the inception of all other forms of blood-poisoning and adynamia, and favor the production and intensify the operation of specific contagia or infection of all kinds, with corresponding zymotic, septic, scorbutic, necræmic, putrescent, mephitic, lithiasic, and other dyscrasic and asthenic diseases, manifested in various forms, degrees, and complications of acute and chronic, functional and organic, general and local disorders of body and mind, according to varying circumstances of habits, weather, season, climate, and other morbific causes.

XV. That, as the volatile organic alkali—Ammonia is so freely engendered and retained in the vital economy from excessive exertion, heat, moisture, alcoholic liquors and other noxious ingesta, defective oxygenation, alimentation, depuration, and elimination, as well as introduced from without in tobacco smoke and other forms of malaria from decomposing organic matter, impure water, and otherwise, while it is solvent, acrimonous, irritant, disorganizing, and induces a typhohæmia or putrid dyscrasia, it is very apt to accumulate in excess in the blood and body and

become the basis, source and origin of the toxæmic and infectious crasis of all scorbutic, necræmic, zymotic, septic, contagious, malignant, putrescent, mephitic, and allied diseases, especially of scurvy, typhus, typhoid, ship, yellow, congestive, bilious, remittent, malarial, puerperal, and other fevers, with cerebro-spinal meningitis, small-pox, scarlatina, measles, diphtheria, cynanche maligna, erysipelas, anthrax, carbunculoid affections, and gangrenous sloughing, and phagedænic wounds, ulcers, and similar foul conditions generally, with hæmorrhœal, catarrhal, lymphoidal, serous, purulent, and other extravasations, as anasarca, hæmoptysis, hæmatemesis, hæmaturia, purpura, bronchorrhœa, leucorrhœa, albuminuria, diarrhœa, cholera in its various forms, and other defluxions, while it engenders an infectious type of an ordinarily innocuous disease, as pneumonia, or pleuro-pneumonia, dysentery, metritis, and other occasional septic varieties of usually non-contagious affections, as well as complicates and intensifies consumption, pertussis, gout, rheumatism, eczematous, and all other diseases—local and general, from the most insignificant and benign to the most malignant.

XVI. That, excess of ammonia in the blood and system is thus the basic, predominant, and prolific cause of the most corrupt, contagious, pestilential, putrescent, and destructive diseases that afflict mankind and the lower animals, and without which they would not develop, or become malignant and infectious, and that all diseases, benign and contagious, local and general may be superimposed upon, or complicated with, this ammoniacal dyscrasia, according to special morbific factors or immediate causes, as for instance, the extraneous influences of heat, filth, con-

fined or impure air, and malaria in the production of superalkalinity of system, congestive, typhus, yellow, remittent, enteric, and other fevers; of gestation in evolving the diathesis and parturition in exciting puerperal eclampsia and fever; of wounds, bruises, or irritations of any kind in arousing erysipelas as well as its spontaneous occurrence from the intensity of the superalkaline dyscrasia; or of cold and moisture, with like general influences, or local irritation of the pharynx and air-passages from tobacco and other causes in developing diphtheria, cynanche maligna, and similar diseases; with the more occult evolution of the actively contagious exanthemata—variola, scarlatina, and their pestiferous correlatives; besides the various intercurrent necræmic, toxæmic, lithæmic, uræmic, choleraic, and transudative disorders; and the more limited local carbunculoid affections and grangrenous conditions,—internal and external, the septic crasis, disorganizing tendencies and malignancy of all which are proportionate to the degree of ammonæmia. Some of these are entirely, and others indirectly dependent upon, and complicated with, this basic superalkaline cachexia, the removal of which more or less completely subverts the whole disease, while its absence prevents the inception thereof.

XVII. That, as the ammoniacal basis and infectious poison of these zymotic, septic, contagious, pestilential, and scorbutic diseases, are largely generated spontaneously within, as well as introduced from without the living body special effort should be made to prevent the development, neutralize and destroy these primary morbific factors with their coexisting and complicating specific contagia, as well as subvert and resolve their concomitant maladies, and, as they are mainly of

an alkaline character, both theory and experience point to *Acids*, antalkaline, and antiseptic substances as the specific counteragents and remedies therefor. It matters not what the special type of the superalkalinity and septicity of the blood, the basic and specific treatment is essentially the same in being antalkaline, and antiseptic, hence the necessity for acids and their correlative antalkaline neutralizing and disinfecting agents, the particular form or nature of which will depend somewhat upon the special variety of the superalkalæmia, toxæmia, and septicæmia, though in general the same, and as the acids and their cognates are inherently antizymotic, antiseptic, antipyretic, disinfectant, resolvent, and depurant, as well as antalkaline, they subserve the various other essential purposes for the prevention and successful treatment of these varied scorbutic, zymotic, septic, contagious, and mephitic diseases.

XVIII. That, in general the most potent antalkaline, antizymotic, antiseptic, counteractive, resolving, and disinfecting agents to most effectually neutralize this superalkalinity of the blood and ammonæmia, with their concomitant toxæmia, and poisons, destroy the specific contagia and microzymes, subvert their morbific effects, depurate the blood and system, frustrate and resolve such malignant and adynamic maladies, are the mineral, vegetal, and animal acids, with some of their basic elements and compounds, as nitric, hydrochloric, nitro-hydrochloric, phosphoric, hydrobromic, sulphuric and sulphurous, carbolic, salicylic, lactic, citric, acetic and other vegetal acids, with their corresponding bases and compounds, as chlorine, chlorides, and chlorates, or chlorine combinations of iron, soda, and lime more exclusively, and to

a certain extent, bromine and bromides, iodine and iodides of the same, sulphur, sulphites, and sulphocarbolates, of soda, salicin and salicylate of soda and bismuth, with the juice of limes, lemons, and other acid fruits and food, as sour buttermilk, and acid albuminoids, usually comprised in an antiscorbutic dietary and hygienic regimen. Of these in general, the hydrochloric, nitro-hydrochloric, phosphoric, lactic, and citric acids, with correlative acid principles and aliment, and corresponding bases and compounds indicated, are ordinarily the most appropriate and specific for the prevention and resolution of these septic, contagious, pestilential, mephitic, putrescent, and adynamic diseases, both constitutional and local, though in some of the latter complications the milder and more astringent sulphuric, sulphurous, acetic, hydrobromic, sulphocarbolic, and like acids with their compounds are most applicable.

XIX. That, for the general superalkaline, scorbutic, septic, toxæmic, infectious, and mephitic dyscrasia, as of scurvy, purpura, necræmia, typhus, ship, remittent, and other fevers, and adynamic diseases, with a putrid crasis or tendency, even with marked local manifestations and complications, as in small-pox, scarlatina, diphtheria, typhoid and puerperal fever, erysipelas, carbunculoid, gangrenous, and other affections of a like character, the mineral, animal, and vegetal acids, especially the nitric, hydrochloric, nitro-hydrochloric, phosphoric, sulphuric, citric, lactic, and acetic acids, with their equivalent acid compounds, juices, fruits, and food, are basic and specific remedies in neutralizing the superalkalinity or ammonæmia and toxæmia, destroying the specific virus and contagium, toxic, and mephitic principles, and underlying cause, drying up

the sources, blighting the concomitant poisons, microzymes, and abnormities, disinfecting the blood and body, and resolving the disease altogether.

XX. That, the neutralization of this ammoniacal and superalkaline dyscrasia, by the basic acid and antalkaline treatment removes the underlying pathogenic cause and resolves the general disorder with the concomitant local lesions, whereas without the subversion of the former, the treatment of the latter is usually of little or no avail, the local manifestation with the constitutional malady running their destructive course and becoming intensified and complicated according to concurring morbific circumstances, as exemplified in septic and adynamic fevers and conditions generally, with local affections, injuries, and ulcerations, the slightest lesion tending to a malignant type, hence the frequent failures of surgical operations, and paramount necessity to correct this superalkaline dyscrasia by appropriate acid medication and regimen, antalkalies, antiscorbutics, and corroborants before, as as well as after, to insure the success of operative procedures, with the resolution and healing of wounds, and local lesions of all kinds.

XXI. That, while in general, the various acids—mineral, animal, and vegetal, with their correlatives, are the basic and specific remedies for the primal underlying morbific causes and pathological conditions of these septic, malignant, contagious, and adynamic diseases, in the more complicated inflammatory cases thereof they sometimes require to be supplemented by more active resolvents as potassium and sodium chlorate or their analogues, though guardedly, and the elements and compounds, other than ammonia, of iodine, bromine, sulphur, as well as chlorine, with in

the more asthenic states, the addition of such stimulants and tonics as oil of turpentine, iron, quinia, strychnia, oxygen, peroxide of hydrogen, nitrous oxide, and other energetic corroborants.

XXII. That, in diphtheria, for instance, while the acids alone are often sufficient to abort and resolve the disease altogether, in the early stage especially, yet, from the complex pathology of the malady, a compound treatment with them as a basis, is usually most certain and reliable to overcome the combined abnormities of the blood, pharynx, and nervous system, constituting the disease. Thus to neutralize the ammonæmia and toxæmia, destroy the septic and infectious matter with the micrococci, disinfect the throat and blood, subvert the formation and dissolve the membranous exudate, and depurate and invigorate the entire system at the same time, nitric, hydrochloric, or nitro-hydrochloric, with citric, lactic, and phosphoric acids are the most useful, though other acids may be exhibited in conjunction therewith, or separately as their absence and necessity requires. In addition, if the exudative tendency is great, the resolvents potassium and sodium chlorate are efficient adjuvants carefully employed in small quantities. For the depression and as a hæmatic, tonic, and antiparalytic, muriate of iron, quinia, and strychnia, or the still more stimulant phosphoric acid and phosphates or lacto-phosphates of the same, may be used in conjunction or alternated with the former. To counteract the typhoid condition, and for general disinfectant, antiseptic, germicidal, stimulant, and other purposes, the oil of turpentine is most efficient, exhibited more or less freely as indicated by diffusion in the air and more direct inhalation, or by the gastro-intestinal canal, as

well as moderately applied externally to the neck and chest if necessary. In conjunction with this treatment a corresponding acid regimen should also be adopted of lemonade, the juice of limes, lemons, grapes, and other acid fruits, with stewed fruit and jellies as cranberry, cherries, plums, apples, or apple butter, and other tart antiscorbutic vegetals, with such corresponding animal food as sour buttermilk, all sweetened to taste and taken *ad libitum*. Indeed, sour buttermilk of itself forms a very agreeable, substantial, and reliable aliment, as well as efficient solvent and medicament through its lactic acid, both locally and constitutionally, though cottage cheese, with acidulated oysters, eggs, and other albuminoids with vinegar, are also applicable, and generally palatable until the disease is resolved and health restored. This basic acid and correlative treatment, according to my experience, most effectually aborts and subdues diphtheria with cognate diseases, as it meets all the varied indications therein and is prompt and positive in both prevention and cure.

XXIII. That, for the milder diphtheroidal types of cynanche, characterized by slight fever, headache, loss of appetite, lassitude, depression, congested and ulcerated sore throat, scorbutic blood, and general malaise, the acid treatment alone with nitro-hydrochloric acid, lemonade, and corresponding acid regimen, is usually very prompt and effective, and will often gratify both patient and physician at the speedy relief and recovery therefrom, the response thereto being too direct and decided to admit of the idea that the disease resolved spontaneously.

XXIV. That, to prevent the further infection, inception, and extension of diphtheria whenever it

appears, the same acid regimen and medication should be adopted by all exposed thereto, the former alone or with nitro-hydrochloric acid in sweetened water or lemonade being prophylactive, and applicable at all times to subvert its development, which largely occurs from the neglect of appropriate acid alimentation with adequate sanitation to remove and avoid all the causes of diphtheria, not the least of which is that ever-present artificially engendered baneful miasm—tobacco smoke, that alkalizes and poisons the blood, irritates and inflames the nares, throat, and air-passages, depresses the nervous, muscular, and general system, disorders the nutritive and vital processes, and acts as an actively exciting as well as predisposing cause of diphtheria with many other abnormities, both local and constitutional, and should be suppressed by all moral and legal means as a potent cause of disease and death in various ways, both directly and indirectly.

XXV. That, both pathologically and clinically diphtheria and croup are distinct diseases though often complicated and merging with each other in every degree, hence termed diphtheritic croup, the extremes being well marked, from the more purely innocuous spasmodic, congestive, inflammatory, and membranous form of the latter to the most malignant and infectious variety of the former, requiring in general opposite modes of treatment. Thus, in diphtheria, mainly by acids, antalkalies, disinfectants, and tonics; in croup, mostly alkalies, antispasmodics, and sedatives, the bromides of sodium and potassium, or, even in some cases, ammonium, and iodoform, being specially indicated therein, as well as in whooping cough, with their analogues, from their local and general anæsthetic, antispasmodic, and resolvent

effects; while hydrobromic acid is better adapted to the sthenic types of the complex varieties, which necessitate a mixed treatment with the sedative or tonic acids, neutral salts and corresponding remedies, according to the special sthenic or asthenic character, tendency, and complications of the local and constitutional affections.

XXVI. That, the same general acid and correlative basic and specific remedies, principles of treatment, and prophylaxis apply in all allied diseases with diphtheria, as in the acute stage and active phlegmonous form of cynanche, and scarlatina, the mineral, and vegetal acids, with potassium and sodium chlorate, or their analogues, are more exclusively applicable, while in the adynamic and putrid stages or varieties of anginose and other affections, it is better to omit or reduce to a minimum the latter according to the degree of local inflammation and exudation, and add the muriates of iron, quinia, and strychnia, alternating with the phosphates or lacto-phosphates of the same, with ol. terebinth. more or less freely according to necessity, acidulated coffee, and other non-alcoholic stimulants as being far better in these and other diseases than spiritous liquors. In the active febrile and inflammatory stage of small-pox, the hydrochloric and nitro-hydrochloric, with the animal and vegetal acids are also the basic remedies, aided by the chlorates or citrates of potassium and sodium or other salines, as indicated, but which should be withdrawn as the sthenic condition declines, and be combined with, or substituted by the muriates of iron and quinia, or strychnia with the acids, in conjunction alternately with phosphoric acid and its compounds of the same with lime in the adynamic conditions, and with sul-

phuric acid and its analogues, and oil of turpentine freely in the typhoid and hæmorrhagic states. The same general treatment is applicable in all the exanthemata. In septicæmia and puerperal fever, active support is required from the beginning, hence the nitromuriatic acid in water or lemonade, and muriatic acid with muriates of iron and quinia, with moderate doses of potassium and sodium chlorate combined, and free stimulation with oil of turpentine, strong acidulated coffee, and other non-alcoholic corroborants, are most appropriate. While in its analogue,—erysipelas, the same nitro-hydrochloric acid, and hydrochloric acid with the chlorides of iron and quinia, and ol. terebinth. are also markedly efficient, the saline resolvents not being usually required therein except in the more phlegmonous form. In carbunculoid affections the acids and chlorates in the more inflammatory states, with the tonic chlorides in the adynamic conditions are actively resolvent and restorative. In typhus, ship, remittent or malarial, and other asthenic fevers without severe local complications, the nitric, muriatic and nitromuriatic, phosphoric, citric, and other acids are actively efficient, though the concomitant adynamia may be more readily overcome by the additional stimulus of quinia, strychnia, oil of turpentine, acidulated or plain coffee, and other non-alcoholic corroborant and tonic agents. In all septic, infectious, and mephitic conditions, *Tar* water forms a mild stimulant, disinfectant, alterative menstruum for the stronger remedies, while lemonade and sour buttermilk are generally useful as antalkaline, antiseptic, antipyretic, refreshing, nutrient and restorative drinks. In the more sthenic stages or varieties of these with other diseases, it is probable that *hydrobromic* acid will be very efficient, especially in irritable

and inflammatory anginose and gastro-intestinal affections or complications, as in scarlet and yellow fever, and gastro-enteritis, phlegmonous, traumatic, and other fevers, with cognate abnormities, though its anæsthetic and sedative properties contraindicate and limit its application in diseases essentially asthenic or with an adynamic tendency. In all such diseases corresponding appropriate local and external applications are useful adjuvants to the general treatment. Thus, with all diseases of this same general class, the mineral, animal, and vegetal acids, or the acid medication and regimen form the specific treatment, to be pushed *ad saturandum* in all cases to overcome the basic superalkalinity and concomitants, specially adapted and supplemented by other remedies as indicated by the varied conditions and complications thereof.

XXVII. That, when stimulants and tonics are required in these and other diseases, phosphoric acid, oil of turpentine, valerian, coffee, tea, coca, oxygen, peroxide of hydrogen, nitrous oxide, quinia, strychnia, and their correlatives, are far better than spirituous liquors in any form. The oil of turpentine is especially efficient as a substitute for alcohol, being superior thereto in many respects, and as a rapid, diffusible, and more permanent stimulant, to the heart, circulation, and system in general, as well as a potent, antizymotic, antiseptic, hæmostatic, discutient, alterative, secernant, diaphoretic, diuretic, laxative, disinfectant, depurant, and restorative, while it can be readily and freely exhibited by involuntary inhalation, without dosing the stomach or risking the acquisition of bibulous habits. Besides, by its diffusion in the air it engenders ozone, and acts as a general disinfectant and germicide, protective of those exposed

to malarious and contagious influences. It may also be required by the stomach and bowels, and should be freely used to disguise the taste and smell of alcoholic liquors whenever they are employed, which should be as seldom as possible. Coffee is also a valuable disinfectant, antiperiodic, antiseptic, febrifuge, digestive, cholagogue, stimulant, and tonic, useful in malarial and low fevers, infectious and adynamic conditions, and as a counteractive to the depression from, and a substitute for, alcohol. Besides, it forms an excellent menstruum for disguising the taste of quinia and other nauseous drugs, while with lemon juice and other acids it is actively remedial and restorative in scorbutic, malarial, septic, contagious, and other diseases, and with milk and sugar a pleasant nutrient supporting drink, that in various forms and combinations may often be medicinally employed with advantage in lieu of more dangerous and expensive remedies. Oxygen, peroxide of hydrogen, nitrous oxide, and other invigorating agents indicated are also far better than alcohol in all essential respects without any of its obnoxious effects.

XXVIII. That, at the best, alcohol is but a temporary stimulant in very small doses for a brief period, and permanent sedative, inebriant, narcotic, and stupefacient, depressing, relaxing, and paralyzing in large or frequent small doses, the very opposite of tonicity and invigoration as amply demonstrated in the familiar phenomena of intoxication or poisoning therewith. In the former period of excitement it thus affords but temporary reactive excitation that soon subsides and requires its frequent repetition in *diminishing* doses to continue its excitable effects, rather

than in increasing and sedative quantities, to thus avoid exhausting or overpowering the inherent vital excitability upon which its stimulant effects depend, as it gives nothing to the system and stimulates only by exciting vital reactive effort to throw it off and resist its poisonous influence, so frequently exhibited in drunkenness. Hence, alcohol in every form is inadequate as a *permanent* stimulant in any case requiring prolonged stimulation and support, and is only adapted in *small* doses for the treatment of temporary states of depression, rather than for severe and prolonged illness, and not at all in the treatment of chronic disease in which permanent stimulants and tonics are required, while it is not preventive but productive of disease in general, and has no property or application whatever as a food or beverage.

XXIX. That, as in common with all other zymotic, septic, and allied diseases, ammonæmia and super-alkalinity of the body is the basis of that destructive pestilence of tropical climes—yellow fever, the acid treatment and regimen with the mineral, animal, and vegetal acids, the nitric, hydrochloric, nitro-hydrochloric, phosphoric, citric, lactic, and acetic acids more particularly, with phenic, sulphurous, sulpho-carbolic, and salicylic acids, and their cognates, chlorine, chlorides, and chlorates, hydrarg. bichlorid, chlorinated soda, bromides, sulpho-carbolates, salicylates, other than ammonia, lime and lemon juice, vinegar, sour buttermilk, and the acid fruit and food generally, with the oil of turpentine, and the more vitalizing oxygen, peroxide of hydrogen, nitrous oxide, and other non-alcoholic stimulants, alteratives, resolvents, and restoratives, as specially indicated, promise to prove specific therefor as in all correlative diseases.

XXX. That, as supplementary to this general acid medication in all scorbutic, zymotic, septic, infectious, mephitic, and cognate diseases—both local and systemic, there should be a corresponding acid dietary with the juice of limes, lemons, oranges and other acidulous fruit, jellies of cranberries and similar acid berries, stewed cherries, apples, plums, prunes, tomatoes, and like antiscorbutic vegetals, with ripe, pulpy, succulent, juicy, tart fruit, like peaches, pears, apricots, grapes, tamarinds, etc., and the more substantial nitrogenized drink and food presented in sour buttermilk and its analogues, all sweetened to taste. Acidulated oysters, eggs, and other concentrated nitrogenous food with vinegar, lemon juice, and like acids, pickled tripe, soused pig's feet, and other acid albuminoids, and peptonized food are also most applicable and nutritious therein.

XXXI. That, as in general this acid medication and alimentation is too secernant and laxative in those cases in which there is undue secretion and defluxion from the bowels and other parts, as in diuresis, diarrhœa, typhoid fever, cholera, and like affections, the more astringent acids, bases, compounds, and regimen, are most appropriate according to special indications, as muriatic, phosphoric, plain or aromatic sulphuric acid, sulphurous, carbolic, acetic, and other constringing acids, with chloride, bromide, or phosphate of iron and lime, or sulphate of iron, sulphocarbolate of soda, and like compounds, with corresponding acidulous fruit juices, and food, as quince, banana, etc., and such astringent, tonic, nutrient drinks as tea with milk and sugar, cold as well as hot tea being very grateful and restorative in diarrhœa and choleraic affections. Milk with lime water

or sulphite of lime, bicarbonate or bisulphite of soda, or peptonized milk and other food, are still more nutrient, emollient, germicidal, and tonic therein. Tea and milk at any temperature, separately or together are specially indicated in intestinal fluxes and cholera, as they are refreshing, nutrient, constipating, supporting, promotive of absorption and restitution of the lost fluid, while they may be taken as freely and frequently as desired, though small quantities at a time are preferable, being far more remedial and nourishing than cold water alone, which is so beneficial in choleraic affections, though hot drinks are usually most applicable, particularly in the collapsed conditions. Tea sweetened and without milk, is a useful vehicle for, and adjuvant of plain or aromatic sulphuric, acetic, and other astringent acids, especially applicable in enteric fever, cholera infantum, cholera, serous, hæmorrhagic, and other profluvia, in which these constringing acids are very efficacious. Also, as indicated, in depression and defluxions, other stimulants and astringents may be added to, or given separately and followed with a draught of tea, as capsicum, krameria, valerian, compt. tinct. of cinchona, sulphuric ether, spirits of camphor, turpentine, etc., to restrain the flow and excite reaction, especially in prostration and collapse from choleraic and other drains.

XXXII. That, in diarrhœa, cholerine, and choleraic defluxions, the astringent acids and their compounds as plain or aromatic sulphuric acid, phosphoric acid with its compounds of iron and lime, simple, aromatized or camphorated vinegar, or a combination of acetate of lead, opium, camphor, and carbolic acid in pill by the stomach, and plumbi acetas with opium in

suppository by the rectum, in doses before stated, with corresponding antalkaline, antizymotic, constringing acidulous drinks, remedies, and regimen elsewhere specified are in general very efficient in correcting the systemic and gastro-intestinal disorder and arresting the profluvia.

XXXIII. That, in the depression, collapse, and typhoid condition of enteric fever, cholera, and all other diseases, the oil of turpentine by free inhalation as well as by the mouth and rectum, and externally, is powerfully stimulant in exciting reaction and restoration. Nitrous oxide is a still more potent stimulant, revivifier, and tonic, and will doubtless excite reaction as promptly in cholera as in other asphyxiated and collapsed conditions, as well as counteract the disease in general. Oxygen and peroxide of hydrogen are also applicable for the same purpose, but are not so stimulant as nitrous oxide, which is a superior exhilarant, invigorant, and restorative that will no doubt prove most efficacious in cholera as in other adynamic disorders. Hypodermic injections of camphorated ether, strychnia, and other reactives, with sub-cutaneous or intravenous injections of artificial serum, and transfusion of blood, are valuable restoratives. Warm clothing, and stimulant applications to the surface of turpentine, allium, capsicum, heat, and other exciting agents are also beneficial.

XXXIV. That, in general, in all zymotic, septic, infectious, febrile, mephitic, and cognate diseases, with the internal medication external application of acidulous and disinfecting agents are also important, as nitro-hydrochloric, muriatic, carbolic, salicylic, and other acids, or vinegar, with chlorine water, chlorinated soda, etc., properly diluted, and applied

to the surface, are very useful in malignant and contagious fevers, malarial, infectious, and mephitic conditions, varying according to the special type of the disease, as chlorine water, disinfecting baths, or solutions of chlorinated soda and lime, sulphurous or carbolic acid, or sulphocarbolate of soda, vinegar, etc., in small-pox, scarlatina, and other exanthemata, while the nitric, hydrochloric, nitro-muriatic, and cognate acids are better in bilious, typhus, yellow, and other fevers and mephitic states, applied either in general bathing, foot or sponge baths, simple lavements, or stronger direct applications, according to the character of the disease, and emergency of treatment; such agents as oil of turpentine, capsicum, allium, mustard, and like excitants with heat particularly, being more applicable in cholera and similar adynamic conditions.

XXXV. That, matter, force, and natural law, are the same always and forever, and life and disease, like fire, are dependent upon definite primal *conditions*, and originate spontaneously at all times and places alike whenever the essential factors or concurring circumstances are present. Hence, the most malignant and contagious, as well as the less infectious, with all innocuous diseases, originate *de novo* at any time, anywhere, whenever the pathogenic factors are favorable for their development, which are dependent upon special *conditions* peculiar to each disease, and not upon time or place, and will thus originate spontaneously at any time, anywhere, whenever the necessary morbific elements or *conditions* are sufficiently active, the specific nature of which it is the duty and should be the object of scientists to discover, avert, neutralize, decompose and destroy.

XXXVI. That, contagious with non-infectious diseases are primarily of a chemico-organic and bio-dynamic, rather than microzymic origin, micro-organisms or the so-called germs being concomitants and sequential, or of secondary development, their evolution and vigor being dependent upon an ammoniacal, corrupt, and degenerate state of the fluids and solids of the vital economy, carbonic acid, water, and ammonia, being the primal essentials for their origin, development, and activity, filth, and decomposing organic matter or putrefaction, breeding them as well as engendering contagia, ptomaines, with other toxic agents, and giving out septic poisons and mephitic miasms within, as well as without the living organism.

XXXVII. That, as Ammonia dissolves and decomposes the corpuscles of the blood and plastic components of the vital tissues, induces a state of superalkalæmia, toxæmia, septicæmia and corruption, and engenders micro-organisms with various poisonous and infectious principles within the living economy, it is the basic pathogenic material and morbific factor in causing scorbutic, necræmic, zymotic, septic, contagious, pestilential, mephitic, colliquative, and allied diseases, and that by its prevention, subversion, neutralization, removal, or destruction, the primal source of these toxic, infectious, and morbific agents, maladies, and microzymes, is overcome, and the whole train of pestiferous sequelæ counteracted and destroyed, which can be most effectually accomplished by the acid antalkaline, antiscorbutic, antizymotic, antiseptic, disinfectant, depurant, resolvent, stimulant, tonic, and sanative medication and alimentation previously specified.

XXXVIII. That for the most perfect protection against disease of all kinds, whether casual, endemic, epidemic, infectious, contagious, or innocuous, besides the purification of surroundings, and avoidance of pernicious ingesta, particularly of those baneful agents—tobacco and alcohol, with vicious habits and practices, efficient means should be adopted to insure personal cleanliness, purity, and healthful vigor of the whole system, as essential to guard against the spontaneous origin, as well as acquisition and communication of contagious, with the development of all other diseases. This *personal* sanitation should be compulsory wherever possible, as well as voluntary, so as to disinfect, depurate, and purify every molecule, cell, part and particle of the *entire* economy, *interior* and exterior, the mere purification of the surface of the body being as insufficient as the cleansing of the outside of a fount of corruption steadily generating within, and sending forth through every pore pestiferous poison. So likewise, the living organism engenders and exhales poisonous and morbific effluvia, that necessitates its constant depuration within, throughout, and from the entire system, to prevent the development or retention, and destroy *ab initio* the internal production of toxic, infectious, and mephitic matter, which uncontrolled is apt to prove a bodily source and *fons et origo* of corruption, disease, pestilence, and death to the individual and community.

XXXIX. That, in quarantine, barracks, prisons, hospitals, and elsewhere, wherever authority prevails, this *personal* disinfection and purification of the blood and body or *entire* vital economy *inside* and outside, should be *enforced* at all times as well as during epidemics, exposure, and special periods of danger,

particularly of filthy people and those coming from infected places, or exposed to extraneous contagion, by this acid antalkaline, disinfectant, antiseptic, antizymotic, and corroborant regimen and medication, as the most positive safeguard in general against contagious and pestilential, with ordinary diseases. But for the greatest success in this bodily purification and prophylaxis against disease, special adaptation of the various disinfecting and sanitary agents, especially of aliment, must be made according to the particular type and tendency of the infection or epidemic, with personal peculiarities and conditions, in unison with the varied character, tendency, and complication of these diverse maladies, which though depending upon the same basic superalkaline dyscrasia, yet need varied special acidulous, antalkaline, antitoxic, neutralizing, disinfectant, depurative, remedial, and dietetic treatment as before specified.

XL. That, as most essential to insure the greatest vigor, purification and protection of the vital economy from impurity, contagia and disease of all kinds, with other essentia of alimentation, there must be perfect *purity* of the inspired *air*, the atmosphere being the great reservoir of the supreme vitalizer, invigorant, disinfectant, tonic, and restorative—oxygen, that constantly penetrates, enlivens, transforms, and animates, as well as disintegrates and depurates, every blood-corpuscle, cell, and fibre of the living organism, any interference with this primal process of aeration, necessarily proportionately induces asphyxia, toxicosis, disease, decline, and death. Hence, as indispensable for the preservation and restoration of health, the use of, or exposure to, all noxious agents that pollute the atmosphere, or malaria, in every form, must be carefully avoided, particularly the poisonous vapor

and smoke of tobacco, obnoxious at all times and especially dangerous during epidemics of diphtheria, cholera, typhus, yellow fever, typhoid and cognate diseases, even to those accustomed to it, and so much the more to the many unaccustomed and supersusceptible to its noxious effects. What folly it is then to prate about the danger and ill effects of malaria, with the necessity for ventilation, pure air and cleanliness, while befouling and permitting the atmosphere almost everywhere to be corrupted by this pernicious miasmatic tobacco smoke that poisons the blood and bodies, and saps the vital power of all who inhale it. What can be expected of the ignorant masses with regard to sanitation in this respect, when even their sanitary guardians and the professed teachers of hygiene (?) themselves thus actively engender this poisonous miasm and pollute the air with this potent nicotian enemy of health and life? Well may we parody the despairing cry of the perishing mariner on the sea, of "Water, water everywhere, but none to drink," by the corresponding one of *Air, air everywhere, but none to breathe*, uncontaminated with the noxious tobacco miasm, though the latter cannot be rejected like the former, but must perforce be inhaled *nolens volens* with all its pestiferous adulterants, thus coercively taking with it into the lungs, blood, and system, this baneful compound miasm of degradation, disease, pestilence, and death to the innocent as well as guilty. To parody Goldsmith, it may be truly said

> Ill fares that land to nicotian miasm a prey,
> Where tobacco blights and human beings decay.

Hence avoidance of all deleterious agents and habits, with purification of the air, purification of the body in its *entirety*—internal and external, are basic essentia of health and life, while common sense, decency, equity,

and self-preservation, instigate to the *suppression* of this poisonous artificial tobacco, with all natural miasmata, as far better than trying to subvert their evil effects, which, with the consequent waste of time, means, and vital energy, degeneration, suffering, and destruction of health and life, would be entirely averted if the former were duly obviated.

XLI. That, finally, as the facts and principles herein presented, are based upon, and in direct accord with, chemistry, physiology, ætiology, pathology, hygiene and therapeutics, they are believed to be correct in science and truth, and if properly applied cannot fail to largely prevent, subvert, resolve and cure these formidable pestilential, zymotic, septic, infectious, contagious, malarial, mephitic, putrescent, and colliquative maladies, with the minor scorbutic, necræmic, and adynamic disorders and complications, that prevail so extensively throughout the world and afflict and destroy mankind with the lower forms of life, and consequently, save from unnecessary sickness, suffering, and premature death, with all their concomitant misery, thousands of human beings and inferior animals—for they are interminably interlinked, who would otherwise suffer and perish therefrom. Therefore, to this desirable end, it is hoped that these views will be subjected to the severest practical test in the prevention and treatment of all such diseases, in quarantine, hospitals, and elsewhere, in public and private—human and veterinary—practice, to most fully determine their true value and extend their benefits as widely as possible to both mankind and the inferior creatures, for ammonæmia and superalkalinity with their toxæmic, contagious, colliquative, and pestilential concomitants occur, and acid, antalkaline, antiscorbutic, antiseptic, and disinfectant

measures are required in all for the preservation and restoration of health. This is exemplified in the varied forms and degrees of typhoid, necræmic, toxæmic, contagious, colliquative, pestilential, gangrenous, putrescent, and allied diseases—constitutional and local, both in man and the lower organisms, all of which are of the same general nature, though variously manifested and complicated by special modifying circumstances and specific contagia, yet originate from, and dependent upon, the same general basic ammoniacal or superalkaline condition, and scorbutic, septic, and corrupt dyscrasia, with the same general process of disorganization of the blood and body decomposition and rottenness, with their concomitant mephites, poisons, infection, and microorganisms, and which, from their general similitude and predominant symptoms in some of the more malignant varieties, have been aptly termed the plague, malaria, black jaundice, black vomit, black tongue, black measles, black small-pox, black disease, black death, cholera, and otherwise designated as indicative of a like general typhohæmia, disorganization, and dissolution, from one common solvent decomposing alkaline agent—*Ammonia*, of intrinsic and extraneous origin, superinduced by and complicated with, various systemic and adventitious causes previously indicated, with often lack of fresh, succulent, acidulous, antalkaline, antiscorbutic, antiseptic, counteracting food, so common with mankind and the inferior creatures, as they are closely affiliated pathologically and therapeutically, as well as physiologically and hygienically, the general laws of life, health, disease, and death, being the same throughout the entire animated creation.